January 6, 1964

NOTES 1-6-64 BELEW

F-1 ENGINE PROGRAM

The second deliverable engine, F-1002, was static tested twice at EAFB as part of the acceptance test program. The tests were scheduled for 40 and 150 seconds. The engine performed for 4 and 150 seconds at thrust levels of 1,290K and 1,421K, respectively. Cutoff on the first test was due to instrumentation line failure.

RL10 ENGINE PROGRAM

Upon direction from Dr. Mueller that the RL10 R&D FY-64 budget reduction from 25 million to 20 million is official, we have taken steps to reduce effort at Pratt & Whitney Aircraft accordingly. This action involves reduction of approximately 400 of the 900 direct personnel employed on this program. If a backup cryogenic service module using the RL10 is initiated, additional effort will be required at P&WA. This effort will be approximately equal to the layoff mentioned above.

J-2 ENGINE PROGRAM

An engine was damaged during a test on December 31. Seal failure between the injector and the thrust chamber resulted in a hot gas leak, which severely damaged the injector and thrust chamber. A detailed report on the incident will be forthcoming.

Engine operational simulator, serial number J204, was delivered to S&ID on January 31.

H-1 ENGINE PROGRAM

Two H-1 R&D engines have been successfully hot-fired for 3,000 seconds each at thrust levels above 200K. Both engines contained improved hardware and one was assembled utilizing hardware identical to that scheduled for incorporation in the first retrofitable 200K production engine.

NOTES 1/2/64 CONSTAN

B 1/8

1. FAILURE OF FORWARD HANDLING RING

During Test No. 6 (tow bar attach point) of the Forward Handling Ring, the tool failed. The welds separated at the point on the spokes where the tow bar is attached. The present fix schedule is as follows:

Re-work instructions January 3, 1964
Re-work complete January 5, 1964
Test start January 6, 1964
Test complete January 13, 1964
Inspection complete January 14, 1964
Barge loading January 15, 1964

Testing will follow the original test procedure sequence.

2. ADMINISTRATIVE LEAVE

The plant was closed at noon Dec. 31, 1963 and all employees sent home because of snow and hazardous road conditions. NASA personnel were granted administrative leave.

Fw 1/6

B 1/8

NOTES 1-6-64 DANNENBERG

1. Biological Payload for SA-10 - Meeting at Houston, attended by Mr. Elms and Dr. Voas, MSC; Mr. Dunning, OART; Dr. Vinograd, OMSF; Dr. Farish, MSFC; etc., resulted in a decision to endorse biological payload by letter from MSC to Headquarters. No direct value to the Apollo program will be stated.

vaguely! B

2. Saturn IB/Centaur - Reentry Problem - A meeting was tentatively set up by Dr. Kuettner for 1-9-64 in Houston, to discuss the third stage for Saturn IB with MSC. Mr. Evans, Dr. Shea, Mr. Piland, and others will participate.

Tw 1/6

NOTES 1-6-64 FORTUNE B 1/8

*Tw 1. Picket Line at L&E Bldg: Three pickets, carrying signs "Harders, Inc. is not in accordance with Local 93 IBEW Working Agreement," appeared on the road leading from Highway 43 to the Laboratory and Engineering Building, Friday morning, 3 January. Harders is sub-contractor for electrical work. Two trucks hauling structural steel and workmen's cars blocked the highway for awhile. State Highway Patrolmen cleared this up but only Corps of Engineers personnel went into the work area. Paul Styles' office has been alerted. Late information indicates serious problem.

Harry G. What's your appraisal? B

2. Snow and Progress Report: 1963 went out with a record-breaking snow storm, 7 inches being officially recorded at MTO Tuesday. Most of it had melted by Friday, but roads were still bad. The harbor was completed last week. We expect to accept the Construction Dock and Road "E" in a few days. Structural steel is rising on some buildings. ✓

3. Contract Negotiations with GE: MSFC personnel agreed in general that the General Electric Co. failed to respond adequately to request for quotations. They were given until 2 January to re-submit this; however, they came in this week for another extension until Monday, 6 January. Our people will review the proposal as soon as they have it in hand. We expect to sit down with them for negotiations about Wednesday. ✓

CONFIDENTIAL

NOTES 1/6/64 GEISSLER B 1/8

1. Lunar Simulator Working Group: Jim Ballance and other Marshall representatives attended above working group meeting at OMSF on Dec. 3, 1963. OMSF and OART (and respective centers) were represented. Meeting purpose was to answer Dr. Seamans' questions on need for a new lunar simulator. A one year study plan for obtaining necessary answers was outlined, with the provision that no facility planning is to be started until this program study plan is completed. A request for Marshall to prepare test requirements for the ALSS program is expected shortly from Dr. Mueller. These test requirements would be reviewed by MSC and other centers. It was stated that Marshall had been assigned ALSS program responsibility. An MSC representative questioned Marshall's capability of conducting an adequate study for the facility and stated that MSC could do required ALSS program testing even though (1) MSC's facility could not meet test requirements specified at meeting, (2) they don't have an Apollo-LEM test program, and (3) they don't have a program schedule. Capt. Frietag stated recently that we could not delay building a facility, and that it should be sited as a national facility.

2. Aero. Lab. Participation in Rhode Design Criteria Handbook Effort: The visit of Mr. Clyde Baker with Mr. Rhode in Washington (see item 5, Notes 12/16/63 Geissler, copy attached) resulted in the following conclusions: (a) Mr. Rhode would like a definite commitment for our participation before allocating funds. Aero. Lab. will participate in the handbook preparation unless you instruct us to the contrary. (b) Subcommittee responsibility for the Vehicle Dynamics and Trajectory Mechanics area of the handbook will be reassigned to Aero. Lab. from MSC.

3. Panel Actions: Reference is made to Action Item 7.4.1 (copy attached as enc. 2) of the Seventh Flight Mechanics, Dynamics, Guidance and Control Coordination Panel Meeting held at MSFC on December 3, 1963, and your question to me on Notes 12/16/63: "What's that?" MSC requested that for Saturn IB mission planning purposes that a guaranteed 3-day minimum spacecraft lifetime in orbit be the basis or criteria for establishing launch vehicle insertion accuracies. In order to guarantee a lifetime of 3 days, the circular orbit altitude will have to be increased or an eccentric orbit will have to be flown. MSC indicates no reservations about flying an eccentric orbit. Therefore MSFC agreed to investigate the performance trade-offs for elliptical vs circular orbit which meet the minimum 3-day lifetime requirement for Saturn IB missions. If any Saturn IB missions require more than a 3-day lifetime, MSC will provide the necessary propulsion to overcome drag effects.

4. Requirements for Q-Ball on SA-8, 9 and 10: Enclosure 3, a memorandum to Director, Saturn I/IB Project Office, I-I/IB-DIR, Subject: LES Tower for SA-9 and 8, was prepared to inform Mr. Lee James of status on SA-8 and 9 LES towers and as a response to your question to me on Notes 12/16/63. Mr. Fikes of Saturn I/IB Project Office has been working very closely with Aero-Astrodynamics Project Office on this question.

CONFIDENTIAL

FW 1/6

NOTES 1-6-64 GRAU B1/8

1. S-I-6 REVERIFICATION: All designated tubing has been removed from the S-I-6 stage. Replacement is in process and scheduled for completion prior to transfer of the vehicle to this Laboratory for continuity checkout and pressure testing during the period of January 11 through January 26, 1964. Electrical certification will not be accomplished during the limited checkout period which has been allocated in order to accomplish delivery of the vehicle to AMR by February 12, 1964.

2. S-IU-6 FINAL CHECKOUT: Electrical reverification of the S-IU-6 Instrument Unit is complete and the unit is now in pressure and functional test. Due to the problems encountered with cracked sleeves, all stainless steel tubing has been removed and replaced with tubing containing reheat-treated sleeves. Tubing removed is being analyzed for possible contamination since a report was received from Launch Operations Center that S-IU-5 contained contamination in the air-bearing systems.

3. S-IV-6 POST-STATIC CHECKOUT AT DAC, SACRAMENTO: Post-static firing checkout of the S-IV-6 stage was completed at Sacramento on December 18, 1963. The stage is now undergoing retrofit of the Moog actuator system. This work should be completed by January 17, 1964. Scheduled shipment to AMR is February 8, 1964.

4. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHOUD: CSD is in process of tube fabrication and replacement on the S-I-8 stage. Adequate stocks of sleeves are available at Michoud for S-I-8. Estimated completion of rework and checkout of the vehicle is February 29, 1964.

5. UNSATISFACTORY CONDITION REPORTING: A magnetic tape record of extracted information from the Unsatisfactory Condition Reporting (UCR) Automatic Data Processing System has been prepared to be sent to Quality Engineering Office at Michoud Operations. This is the first of a series to be sent periodically to Michoud and will be under their control to provide the most recent UCR information to CSD and Boeing.

NOTES 1-6-64 GRUENE B 1/8

SA-5 Status

1. All 338 lines that were determined by P&VE and LVO as critical because of possible cracked sleeves were exchanged and leak checked satisfactorily. Because of time available, a few other lines will be exchanged after consultation with P&VE.

2. During Simulated Flight Test and Radio Frequency Interference Test, an interference was detected between the UDOP System, Telemetry Systems, and Command Signals sent by the Range on a completely different Command Carrier Frequency (450 Megacycles). Special tests with the Range are set for next week to reach a solution to the problem. Hoberg's people are working with us on this problem.

3. We had a long meeting with Range Safety representatives at MSFC on January 3, 1963. This meeting might result in a slight change in the Destruct System for SA-5. In this case, we would contact you to get your "o.k." for the change.

NOTES 1/6/64 HAEUSSERMANN B 1/8

1. USE OF PRINTED CABLES IN SATURN IB/V-IU: I looked very throughly into the application of printed or flat conductor cables for the measuring network in the Saturn IB/V-IU. According to ASTR-E (Electrical Systems Integration Division) the use of the flat conductor cable involves a certain risk in view of flexibility limitations toward modifications, schedule and design. Personally, I believe that this risk is not too great to introduce the flat conductor cable; however, the gain is not too important (about 100 pounds and a marginal increase in reliability). I decided to retain the conventional system in support of the design group (ASTR-E) who has strong feelings against the flat conductor cable. The use of an alloy (90% copper 10% beryllium) for conventional wire with about 90% conductivity of copper possessing higher yield strength, thus allowing smaller wire sizes, will be pursued for the overall IU electrical network in order to obtain a partial weight saving.

2. S-IV ACTUATORS: Mr. T. Gordon, DAC, decided on 12/17/63 to change from Douglas/Hydraulic Research actuators to the Moog system on S-IV-6. IO concurs in the schedule and the change.

3. OPERATIONAL PLAN FOR IBM: It appears that in our meeting with Dr. Mueller we may not have succeded in showing him how we plan to operate with IBM. Our plan, which does provide for minimum wear-and-tear on components, is as follows--in some contrast to your philosophy given to Dr. Mueller on Friday:

a. When the task is transferred to them, IBM will repeat exactly our steps in preparing hardware for the flight Instrument Units. They will checkout the subsystems and components in their facility on subsystem-oriented test equipment.

b. This hardware will be delivered to ME for mechanical installation into the flight IU structure. This is followed by an IU test at Quality Laboratory. IBM supports this test. This is the first time a flight IU is tested as a complete system electrically.

c. Proof of system design is an R&D function carried on using the breadboard as a tool, and therefore, flight items will not normally pass through this facility. A mock-up at IBM will not be a basic requirement but may turn out to be a "nice-to have" feature.

W. H.

We really have a serious communication problem with ASTR. Let's do something about this! B

Hardly surprising! This is the first time I hear this. I've been told by your people that I've been told Mueller, so don't call it "my philosophy"!!

B 1/8

NOTES 1/6/64 HEIMBURG

1. MTF WORKING GROUP:

S-II Test Stand - Reference NOTES 12/16/63 HEIMBURG (copy attached). The S-II Test Stand piling tests were completed satisfactorily on 12/22/63. The four-week delay now incurred probably will affect the present brick and mortar contract completion (based on old Plan V); however, the revised activation date will be within the schedule as defined by Plan VIB. We will continue to follow this situation closely and will advise you promptly of any change therein.

Procurement Plan for Phase II and Phase III Technical Systems - Approval was given on 12/12/63 to include source selection of the GE Company. A Request for Quotation for the initial procurement (technical systems for the Electronics, Instrumentation, and Materials Laboratory - Phase III) is being processed.

ATTACHMENT:
NOTES 12/16/63 HEIMBURG

NOTES 1/6/64 HOELZER B1/8

No Report.

B 1/8

NOTES 1/6/64 JAMES

SATURN I - S-IV Stage - S-IV Helium Sphere Testing - DAC has rerun the ambient vibration test of a cold helium sphere in both tangential and thrust direction at 100% load level (random and sinusodial) with no failures. A hook failure occured under random vibration at 100% load in radial direction. This test was conducted using one bottle mounted on the skin segment used in test No. 1. The retesting of the Cold Helium Sphere assembly was delayed from January 4 to January 7 due to reinspection of the tank fitting weld, under-estimate of required time to build up and leak check the fixture, and minor setup difficulties. The fixture with specimen affixed reached Wyle Laboratory January 4.

S-I Stage - Cracked Sleeve Replacement - All sleeves have been replaced on the S-I-5. There are eleven tube assemblies still remaining to be changed out on S-I-6. ME indicates that the material is available for these assemblies. S-I-6 is expected to be complete and ready for QUAL pressure checking on January 11, 1964.

ME will begin removal and replacement of the critical tubing on S-I-7 about January 27 after the completion of S-I-9.

I.U. - S-I.U.-5 - Fix to the ST-124 platform mounting bridgework will be incorporated in IU-5 on January 7, 1964, at AMR with no impact on schedule. S-I.U.-6 - Tubing changeout on IU-6 is complete and unit is undergoing checkout. The unit will be available for shipment the middle of January, 1964.

SATURN IB - Reference Gruene Notes 12-16-63, Propellant Loading, Saturn IB, Copy attached - As recently as September 21, 1963, this office was of the opinion that the use of the capacitance type fuel sensors for the Saturn IB would not be required for the Saturn IB. This was based on the fact that VLF-39 would not be used to launch the Saturn IB. Since then, this office agreed to install the capacitance probes in SA-203 and subsequent in keeping with the trend of having the Saturn IB as alike the Saturn V as practical. The timing for this phase-in is because the tanks from the cancelled S-I-111 and 112 must be drastically modified to accept these probes or better yet, order new tanks. In response to your note, Chrysler has been requested to investigate the availability of the probes and the impact on the present schedule. There is some question of delivery to Chrysler of the probes from the vendor and having time to do full qualification testing by Chrysler on the present schedule. The S-I/IB Stage Office is continuing to study the schedule problem. (Presently, it appears that the probes may be installed in SA-201 and subsequent vehicles as well as the dynamic test vehicle at a cost of some $250,000.)

I have called Petrone on this and because of technical deficiencies in the delta P loading system and the desire to do all-up development early, LOC would like to change to the capacitance system on 201. However, they can use the delta P system on 201 and 202 if the change appears too costly and in conflict with the schedule. Petrone and I agreed that Art Thompson and Ed Matthews will call an early meeting in order to have a final decision as soon as possible.

NOTES 1-6-64 Koelle

1. FY 1964 FUNDING: We are still in the talking stage on this subject. Dr. Seamans has nothing approved yet, with the exception of one NOVA study. Half of the FY is over and we will probably have great difficulties to obligate all money we might obtain. Mr. Gray has cut our share of the proposed study money from 13.4 to 10.4 million dollars at this time. This is exactly half of the system study funds available to him as of December 6, 1963. We expect further cuts if and when the package reaches Dr. Mueller and Dr. Seamans.

At present we are on the books for the following studies:

	No. of Studies	Funding $\$10^3$
Orbital Operations	2	600
ALLS Payloads	2	1,800
Surface Vehicle Test Bed	1	500
Small Lunar Base	4	600
Chemical SATURN V LLS	1	200
Lunar Transportation Systems	1	150
Lunar Hopper	1	200
Mars Missions	2	400
Reusable Launch Vehicles	2	1,400
Post SATURN Vehicles	3 - 4	2,600
SATURN V Growth Potential	3 - 4	900
Solid Boosters	1	300
Cost Studies	3	500
Cryogenic Tankers	1	250
	28	$10,400,000

This is the total study program at MSFC, including the laboratories.

2. GLOBAL TRANSPORT: On December 18, 1963, I had an opportunity to present my case of an exploratory study on rapid commercial global transport, by means of a two-stage rocket airplane, to Dr. Bisplinghoff in a one-hour presentation. As a result of this discussion, I believe that OART will fund our study (P-111) on this subject. The question remaining is when and how much. The general reception of my presentation was good.

3. 1963 MEETINGS: You might be interested in how much time you have spent with me (and others participating) in discussing future projects during the past year. Here are my statistics: You have participated in a total of 24 discussions and presentations, lasting 32 hours all together. You requested 28 of these meetings; I requested 4 of them. In the first six months we had 14 meetings; during the last six months there were 10 meetings. I believe this was adequate to keep you properly informed and I would be very happy if we could continue at the same rate this year (which is probably optimistic).

7w2/6

NOTES 1-6-64 KUERS B1/8

Negative Report.

FW 1/6

B 1/8

NOTES 1-6-64 MAUS

1. CONTRACTOR MANPOWER FREEZE - We received a TWX from Dr. Mueller Friday, Jan. 3, advising that the request for removal of the manpower freeze on North American Aviation (S&ID Division), Bendix Corp, RCA, and IBM is approved, based on MSFC's assurance that manpower buildups will be controlled by FY 64 budget ceiling. The freeze on Douglas SIVB activities at SACTO was lifted Dec. 26. ✓

2. FY 65 GRAY BOOK - All MSF congressional presentations are now a responsibility of Capt. Freitag to see that they are properly prepared and coordinated. At his request, Jay Foster went to Washington last week to review the presentations to be made to Congress on the FY 65 Budget. ✓

3. APOLLO PROGRAM SCHEDULE COST STUDY - I have appointed Woody Bethay to represent MSFC on the MSF study of Apollo Program Schedules and Cost. Dr. Mueller mentioned this study to you on Saturday. Objective is to compare present funding requirements with requirements for accelerated and decelerated programs; the real purpose is to show that a drastic schedule extension, i.e., 3 and 6 years, would result in significantly higher total program costs. Yes Final results of this study are to be presented at the January 21 Management Council Meeting. ✓

4. MANPOWER - Your question on NOTES 12-16-63 MAUS was answered by a memo to you from Chris Andressen 12-27-63. ✓

Jan 1/6

NOTES 1-6-64 McCartney B 1/8

NO NOTES

Jan 4/6

B 1/8

NOTES 1-6-64 MRAZEK

1. RIFT LH_2 TESTING: The first LH_2 test in the continuing five-foot cylinder program will be held 1-9-64 at Santa Cruz. Four types of internal insulation materials will be evaluated. Douglas 3D insulation is included as a reference material. ✓

2. RIFT TERMINATION: The termination conference required to define the extent of the three technology programs and to document noncontinuing portions of contract NAS8-5600 will be held at Sunnyvale on 1-6/8-64. ✓

3. COLD HELIUM BOTTLES: The acoustic and vibration environment versus flight range time was computed for the S-IV stage cold helium bottles. A comparison indicates that the previously specified input levels are very realistic.

The task of establishing the acoustic environments for ground support equipment located at Launch Complex 39 for Saturn V launch was completed, and these environments have been published in Memorandum R-P&VE-SVE-34-63.

An analysis was completed to determine the vibration loads on the S-IV stage cold helium sphere. Loads for 23 cases of the present design were calculated. Three directions of excitation were considered and these loads were combined with static loads. Stress calculations using the combined loads showed the safety margins to be highly negative. Vibration loads for a proposed modification were also calculated. Loads on the modification are generally lower than those on the present design.

WM

What do we recommend now?

B

4. LOX/PROPANE OR LOX/METHANE SUBSTITUTION IN RL10 SYSTEM: A 30-day study has been initiated to determine the feasibility and cost associated with substituting a LOX/propane or LOX/methane RL10 system in the Apollo Service Module for the present storable propellant system. Cursory analyses indicate that a growth of approximately 3,000 pounds could be accommodated in the Lunar Excursion Module with this change. It appears that a simple change of the present titanium oxidizer tanks for aluminum LOX tanks and slight lengthening of the tanks without lengthening the outer barrel of the stage would be sufficient change to the Service Module to switch propellants. Slight modifications are required in the RL10 engine system to accommodate propane or methane; however, Pratt and Whitney has demonstrated the feasibility of this propellant combination in the RL10 engine. Duplicating the present Service Module requirement of restarting the RL10 engine the required 50 times is expected to be a major problem area. We expect this study to reflect the cost effect of design, fabrication, and testing of this Service Module propulsion system at MSFC, and [illegible] shipment to MSC for installation into the Service Module. ✓

5. J-2 ENGINE SEAL FAILURE: During a test on R&D engine J011 on Test Stand Delta 2A, a Naflex Seal failed at the thrust chamber-injector joint. The ensuing fire destroyed the thrust chamber and injector.

6. TWELVE-ENGINE CLUSTER FIRED: The twelve-engine cluster, being tested at Tullahoma, Tennessee, was checked out and successfully fired for a duration of twelve seconds. The cutoff was a programmed cutoff. This test was satisfactory in all respects. Testing will resume 1-6-64. ✓

7. LH_2 TECHNOLOGY: To date, Engine Project Office is the only group that has established an LH_2 line item ($860,000) in their budget. Two actions have been processed by Saturn V Office, but neither Saturn I/IB nor Saturn V Project Office has established a line item.

WM

We put again steam behind this! B

NOTES 1-6-64 RUDOLPH

1. Schedule "J_1":

Saturn V major contractors have been directed to execute Schedule "J_1" based on the FY 64 funding ceilings. The contractors have been requested to submit by Jan 15, 1964, funding requirements for FY 65, FY 66 and through run-out to support the Schedule "J_1".

2. Manpower Freeze:

Approval for removal of the manpower freeze on North American Aviation (S&ID Div), Bendix Corp., RCA, and IBM was received from Dr. Mueller on Dec 31, 1963. If a general relief of contractor manpower freeze has not been received by Jan 15, 1964, it will be necessary to request at that time a removal of the manpower freeze for Boeing.

3. Personnel:

Mr. Erich Neubert and Mr. Roy Godfrey officially reported for duty in Saturn V Project Office on Jan 6, 1964, Mr. Neubert as S-II Stage Manager and Mr. Godfrey as S-IVB Stage Manager.

4. Mueller Visit (Jan 3 & 4, 1964):

Results of Mueller discussion held at MSFC on Friday and Saturday, Jan 3 and 4, 1964, on subjects of IU, S-IVB and related topics are being summarized for detailed actions and conclusions should be available by mid-week (approx. Jan 8, 1964).

5. Apollo Program Schedule/Cost Study:

Dr. Mueller has requested through John Disher a comparison of presently planned Apollo funding requirements with those for accelerated and decelerated program accomplishment. Three schedules are to be studied:

(a) OMSF planned schedule of January 1963
(b) Program Completion delay of 3 years (from J_1)
(c) Program Completion delay of 6 years (from J_1)

Detailed studies of the J-2 Engine and the S-II Stages are to be used as a basis for analyzing total Saturn V R&D costs. Inputs are required of MSFC. In this connection, this office will provide support to the Executive Staff.

6. S-II Stage:

A review of the S-II Battleship Stage Elec. Firing Equip. was held in late Dec '63 at S&ID by an MSFC team headed by R-Test. The review indicated the design of this equipment to be adequate and approval is forthcoming.

MSFC is considering additional checkout capability at Seal Beach. At present, it appears impossible for S&ID to checkout six vehicles per year with existing facilities. Reprogramming of facility funding and additional Navy property would be required to accomplish the addition of a new two bay vertical checkout building. I expected that! There 2 month-centers just aren't feasible!! B

NOTES - SHEPHERD - 1-6-64

1. FY-64 CofF BUDGET: We have received $10.842M of our FY-64 Program. This money will permit us to award the most critical contracts such as the Navigation Lock at MTO. The balance of funds is expected by February 1, 1964. The totals by location are as follows:

Huntsville - $28.612M
MTO - $93.760M
Michoud - $8.672M
Various Locations $37.153M
TOTAL - $168.197M

2. FY-65 CofF BUDGET: The Bureau of Budget (BOB) has acted on the NASA reclama, including the Marshall projects. A detailed listing of approved projects is shown on Attachment 1. It is important to note that the following projects were not restored by the BOB: (1) Sound Suppressor for the S-IC Test Stand at Huntsville - $6.8M; (2) Expansion of Computation Facilities - $2.4M; (3) Special Fluid Mechanics Laboratory - $1.5M (located at Tullahoma). The FY-65 CofF Program total for Marshall as currently accepted by BOB is $113.528M, broken down as follows: Huntsville $15.966M, Michoud $6.461M, Mississippi $63.941M. Various Locations $27.160M, RIFT 0.

3. CONGRESSIONAL STAFF: As you may recall Col. Harold Dyer, U.S. Corps of Engineer Consultant to House of Representatives Space and Astronautics Committee visited Huntsville, Michoud, Slidell and Mississippi Test Operations on November 18 - 22. Col. Dyer is particularly interested in the facilities part of the program. However, he expressed great interest in the R&D and our future programs. Time did not permit Col. Dyer to talk to Dr. Stuhlinger, Mr. Koelle and others in regard to this part of the program. Col. Dyer was concerned about the Marshall program beyond Saturn V. I feel that it would be very worth while to invite Col. Dyer to return to Marshall for several days for discussions with Aero-Astrodynamics and Research Projects people, and others.

4. BOB LONG: Long's Office of Construction has entered a contract with the Norman Engineering Company of Los Angeles to provide consultant services for the purpose of reviewing CofF estimates for FY-65. The services to be provided are briefly stated as follows: (1) To review supporting data and techniques utilized in the preparation of facility cost estimates; (2) To make an engineering evaluation as to whether the proposed facility meets the requirements; and (3) To make an engineering evaluation as to whether or not the proposed criteria will create the necessary facility. The Norman Engineering people, accompanied by Bob Long, will be at Huntsville beginning January 8.

1 Attachment

B 1/8

NOTES 1-6-63 Stuhlinger

COMPLETE REVISION OF MSFC'S OMSF-SUPPORTING RESEARCH AND TECHNOLOGY PROGRAM: In a teletype from George Mueller to MSFC on January 3, 1964, OMSF confirmed the hold on all commitments of OMSF-supported MSFC research tasks of the FY 64 program which was established on December 4, 1963. MSFC was directed to reorient the program, and to eliminate all work not directly applicable to the lunar landing program. The new program should be presented to OMSF by an MSFC representative on January 15. Guidelines for the new tasks were received by telephone on January 6. They emphasize a hardware program to back up and to improve Saturn components. Since most of this work is Saturn development oriented rather than research oriented, we will join with IO in our effort to comply with the directive. Ed Gray and Merle Waugh from OMSF will come here January 8 for further clarification of the actions we are expected to take.

E. S.

not endorsed by GEM, also
told me he hadn't seen them,
didn't even know Waugh also
drafted them! B

January 13, 1964

OFFICE OF DIRECTOR – MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
	Dr. ~~von~~ Braun			
	B 2/16			

REMARKS

Right — now it is water over the dam

Mr. Webb selected GE

on 10 Feb and we received

the word that afternoon.

MSFC will start negotiations

with GE about 19 Feb.

fw

CODE	NAME	DATE
	fw	2/19

MSFC - Form 495 (Rev August 1963)

OFFICE OF DIRECTOR – MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
	Dr. von Braun			

REMARKS

1. Attached are copies of the Computation Laboratory correspondence relating to the "consequences".

2. The reason "why" the Evaluation Board could not make a recommendation is:

Accor ding to a NASA regulation, the Evaluation Board is only to determine whether a proposal is "satisfactory" or "unsatisfactory" and "not recommended" which company should be selected.

Frank

Didn't GE get the contract, or all this is later over the dam? B 2/11

CODE	NAME	DATE
DIR	F. Williams	2/11/64

MSFC - Form 495 (Rev August 1963)

SUMMARY OF EFFECTS OF CHANGE IN CONTRACTOR ON COMPUTATION LABORATORY

Points covered by the Digital Projects Branch, Data Reduction Branch, Simulation Branch, and Projects and Industry Applications Division should a contract change occur, are as follows:

1. Delays in reduction of static test and flight test data and slippage of operating schedules, could result in serious launch delays

The ability of a new contractor to recruit the GE personnel presently on-board and the percentage of the GE personnel who would desire to join a new contractor is very important. Phase-in time, operating schedules, and launch schedules could be met with a minimum of effort if a big majority of the GE personnel now on-board should elect to join a new contractor. If they do not elect to join a new contractor, then it can be expected that the transition period will take much longer, causing slippages in the operating and launch schedules at MSFC.

2. Time for phasing in a new contractor

This time would depend upon whether or not GE would be willing to assist the new contractor in becoming oriented and familiar with Computation Laboratory's methods of operation. If they are willing to assist the new contractor, the change could be accomplished with a minimum of lost time, otherwise this transition could take several months. The civil service staffing is inadequate to carry on the workload at this time without the aid of qualified contractor support.

3. Increase in physical space

If GE should lose the contract and at the same time agree to assist the new contractor in becoming oriented, then a physical space problem arises. Housing facilities, now available for Computation Laboratory, are inadequate and space for an increase in contractor personnel, even for a short period of time, would become a grave problem.

4. Morale problem

A morale problem now exists among the GE personnel because of their uncertainty of who is going to be awarded the new contract. It is urgent that this question be settled as quickly as possible to alleviate this problem. Consequences for a delay in settling this question would be the loss of some of our best GE personnel.

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Dr. Hoelzer, R-COMP-DIR DATE January 10, 1964

FROM Acting Chief, Digital Projects Branch, R-COMP-RD

SUBJECT Effect on Digital Projects Branch if the In-house Contractor should be changed.

1. Digital Projects Branch, numbering only thirty eight Civil Service personnel, is currently supported by 138 General Electric personnel. Forty-six of these are non-professional equipment operators while the remaining 92 are programmers and analysts. Should another contractor be selected to support R-COMP, the effect on R-COMP-RD would depend on two factors. First, the ability of the new contractor to recruit among the personnel of GE is very important. Should the new contractor be successful in recruiting, say two thirds of the present G.E. personnel, the transition could be effected with a minimum amount of difficulty and loss of time. On the other hand, if the new contractor fails in this respect, the resulting confusion and chaos would have serious results on the entire Marshall program for several months. The second factor is the attitude assumed by G.E. in the event they lose the contract. If they would agree to a transition period so that those programmers, being retained by G.E., could assist the new contract personnel in getting oriented on the various projects, minimum confusion would result. However, this poses another serious problem and that is physical space for the additional personnel. In summary, it is estimated that a new contractor would be successful in recruiting most of the non-professional and about half of the professional personnel of G.E. Therefore, a serious effect on R-COMP productivity can be expected in the event of a contractor change resulting in considerable time lag for Marshall programs.

2. A related problem of serious consequences already exists within R-COMP due to the threat of a contractor change even though it may never materialize. We have been informed that a large number of our G.E. programmers have been applying for jobs at other G.E. installations in Huntsville, Atlanta, and other G.E. programmer installations. Most of these applications are based on the uncertainty in the continuation of the present G.E. contract with R-COMP. This indicates an urgent need for a fast decision on this contract selection; otherwise, we stand to lose some of our best programmers even before this decision and regardless of whether or not the present G.E. contract is continued.

C P Hubbard

C. P. Hubbard

MSFC - Form 488 (August 1960)

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. Prince, R-COMP-DIR DATE January 8, 1964

FROM Chief, Data Reduction Branch, R-COMP-RR

SUBJECT Effect of Changing Contractor in Data Reduction Branch

1. It is anticipated that a change in contractor in the Data Reduction Branch would result in catastrophic delays in the critical areas of reduction of static test and flight test data and in serious delays in the less critical areas. In short, it is felt that the following would result:

a. Test Laboratory could no longer expect the overnight service on static test results that it has had for the past six years; this could have some effect on the pace of ground testing.

b. Propulsion and Vehicle Engineering Laboratory could no longer expect expeditious reduction of data acquired from the Dynamic Test Tower; this could result in a serious slip in the Dynamic Test program with further effects on the launch schedule.

c. The time required for analysis of flight test results could triple; this could result in serious launch delays if the results of one test launch affect the next launch.

2. The foregoing results are based on no phase-in period for a new contractor. These results could be minimized with a two month phase-in; however, the phase-in would require many hours of computer time for dry runs, already in short supply, and a 50 per cent increase in space required, also in short supply.

Roy J. Cochran

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Dr. Hoelzer, R-COMP-DIR DATE January 6, 1964

FROM Chief, Simulation Branch
R-COMP-RS

SUBJECT Effect of Change in Operating Contractor on Simulation Branch Operation

1. The personnel now assigned to the Simulation Branch include 27 Civil Service and 33 General Electric employees. Any change in the operating contractor will have serious consequences because of this percentage of contractor personnel (55%).

2. If all 33 General Electric employees were replaced by personnel with equivalent training and experience, a reasonable change over could be accomplished in six months. Since at least half of this time would be lost in orientation of the new personnel, operating schedules would have to slip an average of three months.

3. There is a reasonable expectation that approximately half of the General Electric employees would elect to join a new contractor because of their interest in the work here, or their reluctance to relocate. If this expectation is justified, the transition problem would be simplified. A three month overlap with one to two months schedule slippage should then be feasible, again assuming that all personnel who did choose to leave were replaced by persons with equal qualifications.

4. The worst situation would be the awarding of the contract to a contractor who could not supply properly qualified personnel. In this event the necessary retraining could require a year with six months or more delay in the Branch operations.

5. Every attempt should be made to insure that the contractor selected is able to provide properly qualified personnel. It is also recommended that an overlap period of at least six months be provided if a new contractor is selected. Additional office space for approximately fifteen people would be required during the overlap period.

Guy L. Lawrence
for FREDERICK T. SHAVER

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. Carl Prince, R-COMP-DIR DATE January 8, 1964

FROM Assistant to Chief, Projects & Industry Applications Division, R-COMP-A

SUBJECT Impact of Changing Computer Support Contractor in The Projects & Industry Application Division, Computation Laboratory

1. I feel it necessary to call to your attention the impact of changing our computer support contractor in the P&IA Division. The impact cannot be measured accurately in dollars alone nor can it be reflected in a bare examination of proposals submitted by prospective bidders. The P&IA Division and its current computer workload has grown since 1957 into a major operation at MSFC. The Division operates some 75 to 80 computer systems involving many critical operations at MSFC, ranging from payroll and accounting data processing to preparation by machine of Saturn engineering documentation control systems. Practically no major organizational element at MSFC operates without substantial data processing services from the Division.

2. Organizationally, the P&IA Division consists of a small civil service management group of 19 persons and a large contractor support group (176 employees) employed in computer systems analysis, programming and operation of equipment. In addition, a special group of 23 contractor personnel (IBM) are performing a two-year study aimed at streamlining and improving data processing services.

3. The large contractor support group of 176 persons has built up gradually since 1957. The group is now highly trained and intimately familiar with the complex data processing systems which they have created. In the event this group must be replaced, a considerable period of overlap with the old and new personnel will be required. The nature of business computer systems is such that transition of systems to other analysts and programmers is a difficult task. This translates into additional dollar cost in salaries, physical space and similar items. Such a transition is certainly possible, but it will be costly.

SUBJECT: Impact of Changing Computer Support Contractor January 8, 1964
In The Projects & Industry Application Division
Computation Laboratory

4. The transition between analyst and programmer personnel (about 80 persons) will require from three to six months depending on the skill of the incoming personnel. The overlap period for operator personnel (about 96 persons) can be relatively short, ranging from a few hours for keypunch operators to perhaps one month for operators of the more complex equipment. The physical space for the overlap period when two sets of professional and operator personnel are aboard will be very critical since present facilities are inadequate. This problem cannot be solved by the P&IA Division alone. Furthermore, the relative size of civil service staff (19) versus the contractor (176) indicates a real danger to operational effectiveness in the event the contractors do not fully cooperate during the transition period. The civil service staff is too small to carry on a "skeleton" operation alone during the breaking-in period for the new contractor. Finally, all plans for new work or forward progress on existing systems must be held in a status quo for a period of approximately six months since the transition period alone will require the full attention of the new contractor.

5. These items are brought to your attention so that adequate funds, physical space, and provision for new work to be held up during the transition period can be provided for, in the event a new contractor is selected.

Chester A. Macomber

Chester A. Macomber

Gorman ! fw 1/13

B 1/14

NOTES 1-13-64 BELEW

F-1 ENGINE PROGRAM

Action has been taken to redirect Rocketdyne to meet the "J" schedule. Budget dollars appear short as compared to projected funding requirements in FY-65.

*fw During acceptance testing of engine F-1002 (second engine for MSFC) excessive external tube leaks under the thrust chamber jacket have developed. Delivery of the engine will be delayed for chamber replacement. ✓

H-1 ENGINE PROGRAM

*fw Incentive contract meetings will be held at Rocketdyne on January 13 & 14, applicable to the H-1 Production Program. ✓

RL10 ENGINE PROGRAM

*fw Approximately 500 (slightly over 7-1/2 % of the total plant and about 1/3 of the RL10 R&D strength) hourly and salaried personnel (direct and indirect) are being laid off at Pratt & Whitney Aircraft as a result of the reduction in FY 1964 and FY 1965 funding for RL10. As a result 37 items have been deleted from the development plan and 26 items have been reduced. Impact info has been passed on to Headquarters through Harry Gorman. ✓

J-2 ENGINE PROGRAM

*fw Due to the Gas Generator valve sticking in open position caused by contamination and galling R&D engine 001-2A had a LOX rich cutoff resulting in considerable damage to the LOX and fuel pump turbines at termination of a 500-second test. ✓

GENERAL

Results from discussions with Lewis Center (Gene Manganiello & others) last week is as follows: Lewis supports the R&D Program on the RL10 as presently defined; some interest exists at Lewis in the use of FLOX in the Centaur depending on the outcome of currently planned FLOX program for Atlas stage. Presently payload capability approximately 2100# vs ultimate requirement for 2400# (FLOX on Atlas gains approximately 600# and on Centaur approximately 300#); Gene Manganiello indicated that they are satisfied with MSFC Management of the RL10 program; Lewis is aware of the activities (discussions etc) relative to a new cryogenic stage (SM), however, with no apparent input. ✓

Incentive contracts are planned for the RL10 and H-1 production programs. To utilize the available know how, arrangement are being made to obtain the services of Sterling Livingston, Management Systems Corporation, as an active participant in structing these contracts, etc. IO Contracts Office is pulling this together. ✓

NOTES 1/13/64 CONSTAN

B 1/14

1. S-IC QUARTERLY REVIEW

The S-IC Quarterly Management Review will be held at 1:00 p.m., January 14, 1964, in Building 4200, Room 609. The S-IC Quarterly Technical Review will be held at 8:00 a.m., January 15, 1964, in the Director's conference room.

fw 1/13

NOTES 1-13-64 DANNENBERG B 1/14

*fw 1. Panel Review Board Secretariat met in Washington to fix agenda for PRB meeting at Cape Kennedy, 1-28-64. Centers will agree not to form separate Checkout Panel and Reliability Panel at this time. Computer sub-committee shall become sub-panel of Electrical Panel. Shea will bring up MSC difficulties to deliver an airframe C/M (not boilerplate) in time for dynamic test program on IB. He questions necessity of providing airframe. MSFC position is being reviewed. KD I understand there is strong evidence that Boilerplate dynamic tests grossly distort results! B

2. Documentation Panel met in Washington on 1-7-64. Two presentations were given by General Electric and the Apollo Engineering Documentation Board (AEDB) to summarize previous documentation activities. The Panel decided to review in two sub-panels the management and program documentation requirements and the engineering documentation requirements. These two sub-panels will make their recommendation at the next Documentation Panel meeting which is tentatively scheduled for February 11, 1964 at MSFC. ✓

3. Reentry meeting at Houston discussed all flight alternatives with Piland and Co., Tommy Thompson sitting silently in. Bellcomm two-stage IB capability appeared over-optimistic. Even without turn around time (2 minutes), 2 stager has only 9600 m/sec at 9500 lb compared to IB/Centaur values of 11,000 m/sec at 12,600 lb. All other alternatives appear too late or too costly. Although IB/Centaur came out as favorite, MSC has not stated as yet a definite opinion. Dr. Kuettner is coordinating with Tommy Thompson presentation to Management Council Meeting. You will be briefed. ✓

4. Bellcomm (Troussoff) has requested a "working level discussion" on payload capability of IB, payload growth potential on V, first manned flight with off-loaded LEM, etc. We will attempt to respond on a working level basis on 1-15-64, and are also aware of the problems that this type of approach could raise. Outcome will be reported. Careful! Careful!! B Good B

5. NAA recommendations for reduction of costs (Johnson/Atwood) will be decided upon by R&DO in cooperation with IO on 1-21-64. ✓

January 17, 1964

Reference Dr. von Braun's question to Mr. Styles on Mr. Constan's NOTES of 1/13/64:

"The strike was over the refusal of the sub-contractor, Harders, of the contractor Warrior Construction Company, to pay the union rate which was the project stabilization agreement rate on December 1. The contractor finally agreed to pay the new rate and they resumed work on Wednesday. The job did not slip. The Corps of Engineers informed me that the contractor, Warrior, was ahead of schedule. Legally the Corps of Engineers cannot force work to be resumed on a contract that is ahead of schedule.

"I am unhappy with the way the Corps of Engineers is handling labor relations and I am going down on Sunday night to meet with people from the Missile Sites Labor Commission and the Corps of Engineers for discussions on this problem.

Paul Styles"

Copy to:
Mr. Newby

FW 1/13

NOTES 1-13-64 FORTUNE

B 1/15

*FW 1. Harbor Dredging Completed: The T. L. James and Company Inc. has completed the Harbor Dredging at MTF and final inspection was held on December 30, 1963. Inspection revealed that the work was satisfactorily accomplished.

*FW 2. Picket Line at L&E Building: Pickets are still at the Laboratory and Engineering Building construction site. However, inclement weather has allowed only one good working day which was last Friday, January 3. If the strike is prolonged, it could have a strong adverse effect upon the timely completion of this project.

3. Contract Negotiations With GE: GE's proposal in answer to the MSFC request was received on Monday, January 6. Throughout the week of the sixth, meetings were held by MSFC's operating officials in which MTO personnel participated in order to consolidate the MSFC position with respect to forthcoming GE-MSFC negotiations which will begin on Monday, January 13.

Paul Styles

How do you appraise the situation?

B

I understand the strike is settled. However Paul Styles has given answer to Frank Williams. He was preparing to send his answer through you to WB but FW called him. BK 1-17-64

Fw 1/13

B 1/15

NOTES 1/13/64 GEISSLER

1. Integrated Lunar Exploration System (ILES) as Proposed by P&VE Laboratory: We have reviewed P&VE's report: "Integrated Lunar Exploration System Concept" dated Oct. 31, 1963, and agree with the last paragraph in your "ILES letter" to Dr. Shea of Dec. 26, 1963, to the effect that "not all aspects of the concept have been entirely thought through." The following comments are offered on subject proposal: (1) Having the ascent stage with the rover at all times is an advantage. However, this could also be accomplished by rendezvous on the lunar surface, which in effect is the Direct Flight Pair (DFP). Subjecting the ascent stage to the roving vehicle shock and vibration hazards encountered during the roving vehicle mission might well be a disadvantage. (2) Comparing the ILES with CLEM does not appear valid due to landed payload and required development effort differences. ILES is rather an alternate to the DFP. (3) The disadvantage of LOR (rendezvous before return) is retained but its advantage (one vehicle only) is lost. The advantage of the DFP (committing man only after safe arrival of cargo on the lunar surface) is lost but the DFP's disadvantage (lunar surface rendezvous) is only replaced with the problems of orbital rendezvous. (4) An added burden is placed on earth based tracking and mission control facilities to handle two vehicles in flight simultaneously. (5) The net payload landed is shown as 36, 813 lbs. (27, 914 lbs. - roving vehicle and 8, 899 lbs. - return stage). This is 8, 813 lbs. in excess of the MSFC quoted LLS capability. The P&VE report does not explain how this would be accomplished; the only way it could be done is by docking more than the ascent stage to the first payload in lunar orbit. This would mean that the roving vehicle is a two piece unit. Namely, the first piece of 14, 119 lbs. comes with the first launch and the second piece of 13, 795 lbs. comes with the second launch and is attached to the return stage (LEM/2). Of course, an alternative would be to fly a smaller roving vehicle of about half the size of the one quoted. This would mean a considerable loss in payload when compared to the direct flight pair.

Agree B

2. Saturn IB Centaur Apollo Reentry Vehicle: A series of meetings on this subject was conducted from just prior to Christmas with a meeting at Lewis through a meeting on January 9 at Houston. A detailed chronology of these meetings, their subjects, and conclusions is attached as enclosure 1. A presentation of an additional review on this subject is planned for January 17, 1964 at 3 p. m. and will up-date technical information presented on December 16, 1963, but will be devoted primarily to the program aspects.

3. Lunar Simulator Working Group: Re: your questions this subject, Notes 1/6/64 Geissler (copy attached as enclosure 2): (1) Major Tom Evans of Advanced Manned Missions Program, NASA Hqs, stated that Marshall had been assigned ALSS program responsibility, and (2) Mr. Kurt Strauss, Dep. Chief, Structures and Mechanics Div., MSC, questioned Marshall's capability.....

We never heard of this! B

4. SA-5 (S-IV) Cutoff Arming: Range Safety has requested that the cutoff arming signal activation for the S-IV-5 stage be changed. If a malfunction should occur, which would cause S-IV-5 all engine cutoff to occur at cutoff arming signal (activated by sensor at 98% LOX depletion), impact could occur on inhabited areas. It is recommended that arming be initiated by timer 450 sec after S-IV ignition or about 31 sec prior to nominal cutoff.

B 1/15

Saturn IB/Centaur Apollo Reentry Vehicle Meeting Chronology

1. Mr. Evans visited LRC prior to Christmas and LRC agreed to support MSFC's study effort. At their request, we agreed to coordinate all activities with GDA Centaur group through their center. ✓

2. A work statement establishing requirements for Marshall's cost & schedule information was handcarried to Lewis by MSFC personnel and discussed on Dec. 31, 1963. Discussions progressed satisfactorily. ✓

3. A visit was then made to GDA, San Diego, for further discussions on January 3, 1964 by Messrs Evans, Brown and Trexler to clarify any questions about the effort GDA was to perform. GDA is cooperative and anxious to support MSFC in this effort. An observation was made that perhaps not enough direct input was being made by the GDA Centaur group, and after discussions they agreed to employ more personnel from the Centaur group directly on the S-1B Centaur Apollo reentry study effort. ✓

4. A trip to Houston was made on January 9, 1964 to discuss this approach to Apollo Reentry Test Support needs. At this meeting, discussions were held between Marshall representatives and MSC representatives including Messrs Piland and Hammock. Messrs Thompson and Grey from Headquarters were present. The discussion was very congenial and fruitful in that it covered information on Saturn IB/Centaur as well as discussions about the other approaches to reentry testing such as Saturn IB 2 stager, Saturn IB/Service Module, and Saturn IB/S-6 combination. Several conclusions may be drawn: (a) MSC is apparently becoming keenly aware of the need for facing up to the question of reentry testing. ✓ (b) They acknowledged that they would supply Marshall with certain specific information which was requested by various Marshall laboratory representatives including a clear delineation of test objectives and information pertinent to trade-off possibilities such as variations in velocity, approach angle, off-loading, etc. (c) They indicated interest in the Saturn IB/Centaur approach and appeared to be more interested in the continuous burn trajectory than the high ellipse approach. This meeting should establish a better understanding between MSC and MSFC in the future in this area.

Frances Evans — Copy to Thad Greene 1/16/64 H

But how about the 2 hr vacuum soak of the heat shield?
B

ENCL #1

NOTES 1-13-64 GRAU

1. S-IU-6 CONTAMINATION TESTING: Contamination test and inspection was performed on tubing removed from Instrument Unit S-IU-6 due to reports from Launch Operations Center of contamination in the air-bearing systems of S-IU-5. Contamination levels were found to be within specified limits on the removed tubing.

2. S-IV PROGRAM: S-IV hydraulic system components received by Propulsion and Vehicle Engineering Laboratory for build-up of a test system were tested by this Laboratory for conformance to cleanliness requirements of MSFC-PROC-166A. The results indicated all components to be excessively contaminated. A representative from this Laboratory was sent to DAC, Santa Monica to witness a quality audit of stock components which were also found to be excessively contaminated. As a result of these events combined with past S-IV contamination problems and S-IV-6 checkout deficiencies, this Laboratory has rejected the S-IV-6 stage and requested that DAC be directed to reclean all S-IV-6 components. Manufacturing checkout of S-IV-7 has been completed. Twenty-three Engineering Orders are to be incorporated before the stage is shipped to Sacramento, presently scheduled for February 8, 1964.

3. S-I-7 LOX TANK GOX PRESSURIZING SYSTEM SCREEN: During post-static modification and pressure test, inspection of the 105" Lox tank Gox pressurizing system screen was made. This inspection was to verify that the new design, which eliminated a previous embrittled metal condition, had successfully endured the effects of static firing. No defects of any kind were noted.

4. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHOUD: The Antenna Checkout, the Command System Checkout and the Radio Frequency Compatibility Tests have been completed on the S-I-8 stage and the test results have been accepted.

5. RADIATION, INCORPORATED QUALITY SURVEY: Representatives from MSFC, MSC, KSC, GSFC, and the Office of Reliability and Quality Assurance, NASA Headquarters conducted a quality survey at Radiation, Incorporated, Melbourne, Florida during the period December 2, 1963 through December 5, 1963. The purpose of this survey, requested by Mr. Howard Weiss of the Office of Reliability and Quality Assurance, was to present to Radiation, Incorporated a common, practical NASA approach to an inspection system acceptable to the four NASA Centers who have contracts with them. Major deviations from the requirements of NASA Quality Publication NPC 200-3 were found in the areas of quality requirement statements within purchase orders and the control of nonconforming material. Other deficiencies noted were minor and not deemed a serious impairment to the satisfactory implementation of quality into the product.

6. DAC S-IVB RELIABILITY PLAN: Douglas Aircraft Company has now officially received the extended Reliability Scope of Work on the S-IVB stage.

Tues 1/13

B 1/15

NOTES 1-13-64 GRUENE

SA-5 Status

1. Due to possible interference with the next Ranger firings, we try to advance our firing date if possible by two days. It is, therefore, necessary to reach a decision on the acceptance of the DAC helium bottle tests by Tuesday, January 14, at the latest.

Can't clear today!

2. The problem of Radio Frequency interference between the Telemetry, UDOP, and Command Systems is not completely solved. Test evaluation is going on and some tests will be made during removal of the structure this week. We do not expect any interference with the structure removed.

3. All tubes to be affected by cracked sleeve action, in addition to those previously mentioned, were exchanged and pressure tested. The total number of exchanged lines came to 365.

Tue 1/13

B 1/15

NOTES 1/13/64 HAEUSSERMANN

continuation of (not project-oriented) (right?) B

1. FUEL CELL: Mr. Esenwein (OMSF) in a phone conversation on 1/7/64 informed us that Dr. Mueller favors the fuel cell R&D work with Allis Chambers. In support of this work, he has directed one of his assistants to request of Dr. Bisplinghoff that one million dollars be made available for this R&D effort. ✓

WH ! But not its use in the I.U. is that correct? B

2. S-IU-500FS: Our latest cost estimate for the 500FS (IU with upper section S-IVB) thermo-vacuum test at DAC, Hunington Beach, is 12.550M broken out as follows:

a. Complete Flight Type Instrument Unit	$ 3.700
b. Apollo & S-IVB Simulators (Complete)	1.500
c. GSE To Support Test Of I.U.	5.350
d. Rental Of Vacuum Chamber (Estimated 17 Weeks)	0.250
e. Manpower (Wages & TDY)	1.500
f. Data Reduction (Estimated) (Computer Time For 20 Days)	0.250
g. Transportation Of I.U. & Trailers From MSFC To Test Site (Assumed To Be Part Of Pregnant Guppy Contract)	0.000
TOTAL ESTIMATED COST	12.550 M

Special spares are not included in this estimate; however, three weeks are provided for trouble-shooting and repair. One notable side benefit to be realized from this project is the systems training of the IBM personnel.

Cost of the RCA-110A needed is included. This does not mean that an additional computer is required but a reallocation of computers presently scheduled. Following completion of the 500FS project, the computer would be available for another location (Complex 39, MTO etc.).

With this information, would you advise that we proceed with procurement actions and implementation of the plan? In view of recent budget changes, do you feel that Dr. Mueller will support this project?

W.H. I consider such a program as absolutely mandatory.

URGENT → Re action to be taken, please ~~call or see me~~ with Duerr & Weber B 1/15

fw 1/13

B 1/15

NOTES 1/13/64 HEIMBURG

*fw 1. F-1 TESTING (STATIC TEST TOWER WEST):

A propellant load test was conducted on the F-1 Facility on 1/7. Simulating S-IC lox pump inlet conditions, thermal pumping was established, and the temperatures were better than necessary to meet S-IC specifications. A 20-second firing (15 seconds of main stage operation) was successfully conducted on 1/10. Purpose of this test was to re-orifice the engine gas generator to allow us to approach S-IC pump inlet conditions. This is a rather tricky situation, since we must operate in a "box" bounded on the high side by the turbine inlet temperature redline and on the low side by the mixture ratio at which the gas generator begins to have combustion "buzzing" (instability). Early evaluation indicates that the re-orificing yielded the expected results. ✓

continue

During engine cutoff, the high lox dome purge line ruptured. This line is a flight item which was incorporated for the first time for this firing. We now understand that this line is being redesigned, because this type failure has been common at Rocketdyne. Until a better design is available, we will return to using the facility line. After-test inspection revealed that additional thrust chamber tube leaks had occurred. ✓

2. H-1 ENGINE CALIBRATION:

A program of engine firings at NEOSHO and MSFC has been agreed upon to determine the reason for differences between Rocketdyne and MSFC calibration data. MSFC data are consistently higher and appear to be verified by flight performance. S-I flight engines consistently have had to be re-orificed as a result of this difference. ✓

*fw 3. MTF WORKING GROUP:

Evaluation of the overall nation-wide liquid hydrogen supply as a part of the procurement action of the MTF hydrogen facility has been completed. Results of this evaluation will be presented to OMSF on Tuesday, 1/14, and to Mr. Webb (NASA Headquarters) on Wednesday, 1/15. ✓

It is the function of SEB

to

1. Analyze the proposals
2. Extract the advantages and disadvantages of each
3. Demonstrate which proposal is the best, by how much difference it is better, with an explanation of the judgment factors

4. The relative ratings ~~of the~~ assigned to ~~the~~ the proposals will illustrate what the board "finds" (~~recommends~~) but the "findings" may not be called a "recommendation". This is ~~not~~ so because the Administrator literally makes the selection, rather than approves a recommendation. The selection of course may properly be influenced by the judgment of the expert members of SEB.

(P) the adverse effects that would be suffered by Complainant if a [redacted] replacement contractor is selected should be reflected in the SEB findings.

Fw 1/13

NOTES 1/13/64 HOELZER B 1/15

GE CONTRACT: As you know we were forced to put our in-house support contract out on a competitive basis this year. This we have done and have received two proposals; one from GE, of course, and one from C-E-I-R. These proposals are being evaluated by the Evaluation Board and the data should be ready to go to Washington, either this week or next. Mr. Webb will make the selection of the company with which we are to negotiate for next year's contract. The Evaluation Board cannot even make a recommendation. WHY? In the event that we have to change contracts, you can expect some fairly serious consequences in the operation of the Computation Laboratory. I have sent to Mr. Weidner a statement of these consequences and this is available to you on request.

Would like to see it B

Frank

Please find out

B

fw 1/13

B 1/15

NOTES 1/13/64 JAMES

*fw SATURN I - SA-6 - ME has completed replacement of critical tubing on S-I-6. The S-I-6 and I.U.-6 are scheduled to be shipped on February 1 with arrival at KSC on February 12. S-IV-6 is scheduled to be delivered to KSC on February 15.

S-IV Stage - S-IV Helium Sphere Testing - The testing of the cold helium sphere is continuing with random vibration tests in the thrust axis completed successfully on January 9. Random test should be completed by January 13. All tests will be completed this week.

All Systems Stage - Checkout is continuing on the all systems stage with turbine spin and first static firing scheduled for January 21, 1964.

SA-10 Payload - A project proposal on the advanced micrometeoroid payload for SA-10 has been prepared by this office and distributed to the Laboratories for comment. Upon receipt of comments, proposal will be finalized and forwarded to NASA Headquarters.

*fw SATURN IB - Dynamic Test Program - The Saturn IB test schedule has been revised to accomodate hardware slippage forecast by DAC and MSC. A memorandum is being prepared which will alert all effected Laboratories that only six weeks is now allocated for removing, refurbishing and shipping the S-IB dynamic and facility stage to KSC in time for wet test of VLF-34.

LJ Tell Lilly, please B

FY-66 BUDGET CALL - Marshall has unofficially been requested to submit the flash FY-66 budget estimates to Headquarters by February 1, 1964. Prior to receipt of this request, our planning has been based on submitting this flash budget estimate to Headquarters no later than February 20, 1964. Based on recent program changes resulting in a new schedule and on prior planning which requires Laboratory budget submissions by February 3, the FY 66 budget estimates cannot be submitted by February 1 with any degree of confidence.

PROPOSED SCHEDULING AND REVIEW PROCEDURE - At the January 21 Management Council Meeting, an item to be discussed is a proposal for the integration and operation of a top level PERT planning network as a part of the manned space flight scheduling system. NASA Headquarters has been working on a planning network of this type for a few months. It is our understanding that Mr. Lilly will make a presentation and proposal for implementing this planning network into the scheduling system. I have reviewed a draft of this proposal (which may not be identical to Lilly's proposal) which, in essence, retains all of the current SARP schedules, with the possible exception of part of Level four, in addition to the requirement for top level PERT reporting. This would require the exchange and correlation of data between Headquarters and MSFC in two systems, PERT and SARP. If this system; as outlined in the draft; is adopted, my estimate of the work load involved is that it is greater than the current SARP system reporting through Level 4. As discussed many times, any increased reporting requirements to Headquarters will be further detrimental to my ability to properly manage my projects.

Bowie OK RSB 1/16

Please place photostatic copy of last par in my Management Council folder

B

NOTES 1-13-64 Koelle

1. POST-APOLLO SATURN IB MARKET: During Ed Gray's visit last week, I had an opportunity to inform him that now is the time to plan for missions of the SATURN IB for the post-APOLLO time period (mid 1968). In my opinion, there is a great probability that we will not have a large enough market to keep the SATURN IB production line going. New payloads of a complex nature for 1968 and 1969 are almost out of question, due to lack of resources. Further, we have the competition of TITAN III to expect and we should not forget that the SATURN V also is around. With a firing rate of 2 per year (which could be all we might be able to sell for 1968/69/70), the cost of the IB might be more than the SATURN V. I am greatly concerned about the prospects in this area and am trying to get some joint activity started among OMSF (Gray), MSC, and MSFC to complement the contractor effort, which just resulted in their first report (containing a little too much window dressing and not enough analysis).

2. FY 1963 OMSF STUDY PROGRAM (Status January 7, 1964): Our study program, which started out as a 13.4 million dollar item, after several reductions has now passed Dr. Mueller's desk and, in the process, was reduced by an additional $900,000. It is now on its way to Dr. Seamans. The present status is as follows:

	10^3 $
Orbital Launch Operations	500
Spent Stages	100
ALSS Payloads	1,900
LESA - Lunar Exploration System APOLLO (which is now the code name for Lunar Base)	600
Chemical SATURN V LLS	200
Planetary Mission Studies	600
Launch Vehicle Requirements	500
SATURN V Improvements	1,500
Post-SATURN (NOVA)	1,500
Reusable Launch Vehicles	1,400
Cryogenic Tanker	250
Vehicle Costs	500
10^3 $	9,550

We do not have this money as yet; only 1.500,000 for Post-SATURN. (NOVA)

3. 1963 MEETINGS: Re-NOTES 1-6-64: I reported that you had at an average of two meetings per month during the last year concerning future projects. I expressed hope that we could continue at this frequency and added, "which is probably optimistic." You asked, "WHY." My answer: My intuition tells me that your time is becoming more precious.

Nothing is more precious than the future!

HHK is wrong in this case (to wit: Orion briefing)

B

FW 1/13

B 1/15

NOTES 1-13-64 KUERS

S-IC-T Static Test Stage: As we have known for a long time the problem number one for the T-vehicle has been the design and fabrication of components and sub-assemblies of the Thrust Structure by Boeing. Considerable improvements in the delivery schedule for these items has been achieved by Boeing during the last month, but the present forecast is still not compatible with the new Schedule VI. In order to give us a chance to meet the new target date of November 9 delivery to Test Laboratory we have completely changed our assembly sequence. The vehicle is being built in two units: (1) The lower unit consisting of Thrust Structure plus Fuel Container and (2) The upper unit consisting of Intertank Section, Lox Container, and Skirt Section. In this new concept we revised the sequence by building the upper unit first and the lower unit second. This sequence gives us more time to complete the Thrust Structure assembly but is very inconvenient for us in many other respects. It squeezes the time for the Lox Container fabrication and also the installation time for the ducting and propulsion system into the Thrust Structure. This schedule VI is still a very tight schedule with a number of manufacturing process problems not yet completely solved. The last weld of Y-ring to upper Bulkhead for the T-Fuel Container has been unsuccessful because of excessive porosity. We believe we know now the solution for this problem but verification of the new technique will take another week until we can start to reweld this Y-ring. In the Thrust Structure assembly we hope to receive sufficient number of components from Boeing to start two shift operations in about two weeks.

fw 1/13

NOTES 1-13-64 MAUS B 1/15

1. MANAGEMENT SYSTEMS REVIEW COMMITTEE- The initial meeting of the Management Systems Review Committee was held on Jan. 6. Group leader assignments for specific studies were made as follows:

Budget Collection Procedure	Mr. Snyder, FIN-B
Budget Execution Procedure	Mr. Hutten, EX-DIR
Short Form Procurement Plan	Mr. Buckner, PR-CH
Status of Procurement Actions	Mr. Bailey, FIN-S
Review of Procurement Process Flow	Mr. Crouch, EX-S

Discussion in the meeting resulted in several items which have been referred to the appropriate study groups for consideration. Second meeting of the Committee is to be held today, at which the first reports of the subcommittees will be presented. ✓

2. MSF COMMITTEE ON PROGRAM SCHEDULING AND REVIEW PROCEDURES - Tom Smith is in NASA hdqs. today for the meeting of the Committee for Review of MSF Program Scheduling Procedures. Dr. Mueller activated this Committee during the Dec. 17 Program Status Review to study recommended changes to the present scheduling system. Items being considered are:

   Type of scheduling format to be used,
   Degree and method by which PERT will be used in overall schedules,
   What is the earliest possible time each month that we can hold the Program Review, with previous month's data.

Our position on the scheduling system, which is concurred in by Bob Young, provides for integration of the top level PERT network with the present scheduling system. ✓

3. NASA REQUIREMENT FOR PROGRAM OBLIGATION PLANS - Dr. Seamans has placed a requirement on all Centers to submit Program Obligations Plans on a quarterly basis covering all projects to the systems level. For the initial submissions, balance of FY64 will be detailed by month, FY65 will be by quarters, and after that, by years through runout.

In addition to citing fund requirements to the systems level, the major contracts are to be shown under each system. This is intended to be an "all-purpose" document, replacing the annual preliminary and final budget submissions, financial operating plan, and the technical operating plans; however, there may be additional "special purpose" submissions requested as specific needs arise. ✓

✓First submission is requested by February 1, 1964.

fw 1/13

B 1/15

NOTES 1-13-64 McCartney

1. $50M Transfer Study: On January 6, Financial Management Office and my Programs and Contracts Group initiated a detailed study with each laboratory to determine which monies should be transferred from R&D Operations-managed contracts to Industrial Operations-managed contracts. The study is expected to be completed on January 15, and will show total R&D Operations Saturn dollars we think cannot be reflected in costs by June 30. On January 15-17, we plan discussions with Industrial Operations, Financial Management Office, and Executive Staff to define a new Program Operating Plan for the rest of FY-64. In the meantime, we have agreed with Industrial Operations on an immediate transfer to them of $25.3M. Additional money to be transferred will be defined during the January 15-17 discussion. ✓

2. FY-66 CofF Program: Mr. Read of my Facilities Group and the laboratories are continuing development of R&D Operations requirements for the FY-66 CofF Program. Present estimates are that the R&D requirements will total somewhere between $20M and $25M. Since these facilities will not be operational until CY-67, few of them can be justified for Saturn support. Our approach is that FY-66 facilities be justified on the basis of rounding out the R&D Operations technical capability. On January 10, Mr. Read and Mr. Wade, Facilities and Design Office, visited NASA Headquarters to discuss this subject in general terms with members of Captain Freitag's Office; they agreed with our approach. ✓

3. Manpower:

a. We have reached an agreement with Executive Staff to bring the manpower information (civil service, support contractors, prime contractors on a local task basis, co-ops, apprentices, consultants, etc.) into one consolidated format for each laboratory. This will be issued by Dr. McCall to the laboratories in the next few weeks. It will provide a good consolidated viewpoint of manpower status by laboratory. ✓

b. We have met with the Manpower Committee (McCall, Balch, Huth, and Andressen) to determine the distribution of new civil service spaces. Investigations are currently under way to identify the number of spaces required (1) for overall Marshall/MTO buildup, (2) for the number of spaces required for weeding out support contractors from sensitive positions, and (3) to fill critical positions throughout Marshall. This is a Marshall-wide effort and is not restricted just to R&D Operations. ✓

NOTES 1-13-64 MRAZEK

1. COLD HELIUM BOTTLES: (Reference NOTES 1-6-64 MRAZEK, paragraph 3.) First random cold test was completed 1-9-64 using MSFC specifications in the thrust axis. Test looks good. Test in the radial direction was run 1-11-64--no results yet. Tangential axis test will be performed by 1-13-64. If these test results are OK, a decision could be made on launch of SA-5 with the present design by 1-15-64. If there is test failure in the tangential axis, we will have to appraise the risk for the launch. We would like more time to inspect the bottle after the random tests, but this would delay the decision to fly until 1-16-64.

2. CONTAMINATION STUDIES: Important hydraulic system contamination studies are being held up by lack of Douglas Aircraft Company hydraulic hardware. This hardware is urgently needed to complete the contamination studies prior to S-IV-6 flight.

3. J-2 ENGINE: A 503.8-second full-duration run was accomplished 1-6-64 on test stand Delta 2B. This is the third full-duration run to date. At cutoff the gas generator LOX valve failed to close and caused extensive fuel turbopump and exhaust system damage

4. RIFT PROGRAM PRESENTATION: Dr. Plank, and other key members of the Lockheed RIFT organization, will make a detailed technical program presentation to interested MSFC personnel on 1-16-64. This presentation will cover not only the work which is being continued under the "partial termination" directive, but also the work which has been terminated. A large attendance is expected, since much of the work done by Lockheed has been useful to other projects. If any work of this type has been terminated, it should be identified and considered for continuation under the appropriate project.

5. RIFT TERMINATION: Lockheed's termination proposal is due at MSFC by 1-15-64 with negotiations scheduled for the week of 1-19-64. Preliminary discussions indicate that the termination and phaseout effort, which will be proposed by Lockheed, can probably be funded within approximately the $2.8 million allotted to,but uncosted in,the contract. If this can be done, the Office of Nuclear Systems will "recoup" approximately $3.5 million from the amount originally programmed for Lockheed in fiscal year 1964.

6. VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: This group had its sixth meeting this week on the S-II stage. Resulting action items are attached.

7. S-I-5 CRES TUBE ASSEMBLY REPLACEMENT: Because of cracked sleeves (attributed to improper heat treatment), approximately 350 Cres tube assemblies were replaced on S-I-5. Pressure tests during checkout showed that leakage occurred at only two connections of the 350 tube assemblies that were installed. Since the rework occurred under field conditions, high reliability of the MC connector is indicated.

8. S-IV-6 HYDRAULIC SYSTEM CHANGE: Difficulties encountered with the S-IV-5 hydraulic system have prompted the installation of the redesigned MOOG-Bertea system on S-IV-6. Inspection revealed certified clean components with contamination above allowable limits. Douglas Aircraft Company is recleaning all components and tubing; the hydraulic pumps will also be cleaned.

9. 1,750-POUND THRUST ULLAGE ENGINE TEST: This test was made at sea-level conditions to evaluate the effect of increasing the contraction ratio on the combustion instability problem. No sustained instability was experienced during 85 seconds of burntime. The test was terminated by fuel depletion.

Attachment #1: NOTES 1-6-64 MRAZEK
Attachment #2: Action Item Report

NOTES 1/13/64 RUDOLPH

1. S-IC Stage:

Quarterly Review - The Quarterly Management and Technical Progress Review with Boeing will be held on January 14 and 15, 1964.

Telemetry - The Astrionics Laboratory has informed this office that the requirement for Boeing to qualify the MSFC designed telemetry should be deleted from the contract. The Astrionics Laboratory will be responsible for this qualification and will furnish Boeing with necessary documentation to carry out their contractual obligations.

2. S-II Stage:

Vertical Assembly Building - S&ID moved S-II tooling equipment into Station I in the Vertical Assembly Building at Seal Beach on January 2, 1964, and into Station VI on January 3, 1964. The Navy met their JOD commitment date.

Vertical Checkout Building - S&ID has been requested to furnish engineering requirements for a two bay vertical checkout building proposed for Seal Beach. This request was made in view of a December 16, 1963, presentation which indicated existing facilities are insufficient for a rate of six vehicles per year.

Battleship Test Program - NAA has proposed an August 31, 1964, date for firing of the S-II battleship; however, to accomplish this they have asked for an additional $831,000 construction money to accelerate construction work by January 15, 1964. NAA was informed that no additional facility funds will be applied, because of the problem involved in requesting additional authority from Congress. In lieu of the August 31 date the contractor said a first firing could be met possibly by October 31, 1964, without facility premium effort. This delay in first firing of the battleship stage will have no impact on meeting the J_1 launch schedule.

3. S-IVB Stage:

Battleship Test Stage - Water calibration of the battleship tank in the stand at SACTO has been completed.

4. Instrument Unit:

IBM Contract - Recommendation (common position of this office, Astrionics, and Contracts Office) on type of contract for IBM on guidance computer and data adapter has been written and will be sent shortly to NASA Headquarters.

ST-124 Procurement Plan - The rewritten procurement plan was handcarried to NASA Headquarters on January 8, 1964. A teletype was sent to Dr. Mueller on January 9, 1964, asking for his support in getting fast approval of this procurement plan.

5. Vehicle GSE:

RCA 110A - Current RCA 110A delivery schedule will cause a delay in the MSFC system breadboard operations and the checkout of the first S-IC stage.

fw 1/13

NOTES-1-13-64-SHEPHERD B 1/15

BOB LONG: As reported last week, the Norman Engineering Company of Los Angeles visited Huntsville in connection with the contract from Mr. Long's office. Prior to the review we met with Bob Long and reached an agreement that the Norman people would only review requirements, criteria or design to permit them to properly evaluate our cost estimating procedure. They are not to review or evaluate our requirements, criteria or design. I had an exit interview with Norman Fink on January 10, during which he indicated he had found no major discrepancies in our method. However, he did note that there was some lack of uniformity between various projects as to our methods. While this contract appears to go beyond the scope of Mr. Long's office, I do not believe it is objectional enough, for us to have a head-knocking session with Mr. Long. This should be reserved for some other problems.

fw 1/13

B 1/15

NOTES 1-13-64 Stuhlinger

*fw 1. SA-10: Dr. Bisplinghoff showed great interest in the scientific payload for SA-10 as proposed by MSFC-FSC, and he indicated that OART will make the necessary funding available, provided that a mutually agreeable mission plan can be established. He invited other centers to propose further experiments by January 15. Members of OART & MSFC agreed that the final decision regarding experiments to be carried by SA-10 must be made by January 21.

2. ALSS PROJECT: An initial scientific mission plan has been developed for the ALSS payload. Dr. Dan Hale has approached four members of the scientific community (Arnold, MacDonald, Shoemaker, and Urey) with the mission plan seeking their appraisal and comments. It was received very favorably and their comments have been incorporated in the latest version. We plan continued contacts with such leading scientists to insure approval (or less resistance) from the scientific community.

3. METEOROID MEASUREMENT PROJECT: The radiation problem which was encountered in connection with the detector system appears to have been successfully circumvented by the design of a discrimination circuit. Tests of the circuit at the Ling-Temco-Vought radiation facility indicate a capability of maintaining a "false alarm" rate less that 5×10^{-4} independent of sensor temperature.

There is still insufficient data to permit a clear cut decision as to the manufacturer of the capacitor-detector panels. It, therefore, has been decided to continue the parallel programs, through prototype production and testing, at a level to provide full production from FSC and one-half capacity production from Schjeldahl. One producer will be terminated at completion of prototype testing. The estimated increased cost for continuing parallel programs is about $80,000.

Dynamic tests of the capsule design, using the Dynamic Test Model and testing through residence dwell in all three axis, have been completed at G.E., Valley Forge. No failures necessitating major redesign were encountered. The basic capsule design has proven quite satisfactory.

January 20, 1964

Debus

NOTES TO MUELLER 1-21-64 DEBUS

1. R&D Program Authorization: We have been notified that our FY-64 annual plan has been approved at the reduced levels we presented at the 16 December program review. This reduced the previous total of $74,000,000 to $64,300,000.

2. Structural Steel for the Vertical Assembly Building: Setting of the column base plates has started. Several loads of minor structural members have arrived on the job site.

3. Frequency Control Analysis Facility: Bids opened January 9, 1964.

Apparent low bidder: W. Pangborne & Lowery	$1,443,289.20
Five other bids ranging up to	1,571,359.28
Government Estimate	1,422,423.00

4. Kennedy Space Center Headquarters Building: Bids opened January 14, 1964.

Apparent low bidder: Franchi Const. Co.	$7,112,912.61
Five other bids ranging up to	8,738,000.00
Government Estimate	7,740,874.00

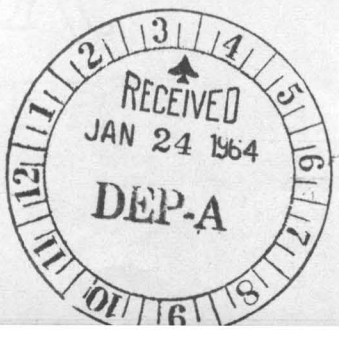
5. Main Cafeteria, MILA: Bids opened January 15, 1964.

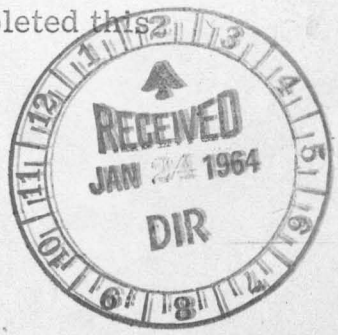
Apparent low bidder: Bucon, Inc.	$ 568,565.00
Three other bids ranging up to	657,914.25
Government Estimate	598,276.00

6. Emergency Egress Requirements: The recent meeting of the Egress Committee called by KSC resulted in complete accord with MSC (including astronaut participation) on the following provisions:

a. Our recommended provisions for LC 34 and 37 were accented with the same design for all pads. Implementation will be for 34 and 37B.

b. The high speed elevator and escape chute into a ground safety chamber on Launch Pad 39 were completely compatible with astronaut desires. AE detail design for staging room will be completed this month.





7. Appeal of Bucon, Inc. to NASA Board of Contract Appeals: The KSC Contracting Officer has rendered final decisions on two disputes which have arisen under Contract NAS10-831 with Bucon, Inc. The Contractor has appealed the Contracting Officer's decision on each disputed matter to the NASA Board of Contract Appeals. The first disputed matter involves denial of $18,846.10 additional costs claimed by the Contractor for performance of work arising out of 14 contract modifications. The second appeal involves denial of a claim for $33,906.00 which represents additional contract costs due to alleged inefficiency of union labor which Contractor attributes to the Government. NASA General Counsel's Office has advised that the Chief Counsel, KSC, will be appointed Trial Counsel for both appeals.

8. Cost Reduction Activities: Ernest Swieda of the Resources Office has been established as our full time participant in the NASA Cost Reduction and Control Program described in Mr. Webb's memorandum of 31 December. Swieda was hired several months ago for Value Engineering work consistent with our continuing efforts to ensure efficient utilization of resources. This function is identical with the philosophy of the Cost Reduction program.

9. Recruitment: Sent a KSC representative to Sarasota, Florida with personnel to interview approximately 15 mechanical and electrical engineers who were being laid off by Electro-Mechanical Company. The salary demands ranged from 13,000 to 20,000 dollars which as you know are not consistent with Civil Service scales.

10. Banana River Bridge: The Banana River Bridge was opened to limited official Government vehicles on 1-13-64. Use of this bridge at the convenience of the construction contractor.

NOTES 1-20-64 BELEW

B11/23

RL10 ENGINE PROGRAM

Recently we have been contacted by a number of organizations (such as Grumman, Douglas, Boeing, and MSC) who are formulating schedules and costs for cryogenic stages, using the RL10 or a modified RL10 Engine.

The flight of Centaur AC-3 has been rescheduled from March 1964 to May 1964. This is due, in part, to a decision to use lightweight, jettisonable, insulation and nose fairing panels on this flight. The Centaur AC-4 vehicle is now scheduled to be flown in late August 1964.

J-2 ENGINE PROGRAM

Fuel recirculation tests, using a Pesco developed pump in the fuel inlet duct, were conducted for 3 days on test stand Delta-2B. The data is currently being evaluated.

H-1 ENGINE PROGRAM

Four H-1 R&D engines have been subjected to 83 hot firings for a total of 10,000 seconds at average thrust levels of 205K. These tests have provided sufficient data to allow redesign of both main propellant valves and the LOX high pressure duct. Tests are continuing to determine the adequacy of remaining components at the 200K level.

F-1 ENGINE PROGRAM

Replacement of faulty welds on the flame deflector for test stand 1-D is expected to be complete January 20, 1964.

Corps of Engineers has submitted a new expansion joint design for the deflector to the contractor and is waiting for the cost estimate.

A team from the Corps of Engineers, Chief of Engineers Office, visited the new construction at NASA Engine Test Site, Edwards AFB on January 13 and 14. The purpose of the visit was to review general construction procedure and quality on cryogenics facility construction, which will be used in a national cryogenics report the Corps of Engineers is preparing.

GENERAL

It is tentatively planned that Dr. Mueller will be at Pratt & Whitney for a few hours on January 27, 1964. A presentation similar to the one given by P&WA here at MSFC is planned plus a tour of facilities. Bob Young and I also plan to be there.

In keeping with the spirit of a better team effort thoughout, Rocketdyne has started a series of subcontractor and vendor conferences covering such things as overall program objectives, free exchange of information, problems etc. It is suggested that MSFC participate. I feel that it would be good for some of our key people to participate, and will arrange if desired.

B1/23

NOTES 1/17/64 CONSTAN

1. VISIT OF PROGRAM MANAGERS OF THE APOLLO CONTRACTORS

The program managers of the Apollo contractors will visit Michoud Operations on Wednesday, January 29, 1964. The program managers are vice-presidents of their companies and the purpose of the visit is essentially the same as the recent visit by the senior executives of the Apollo contractors. Briefing and tour of the facilities will be directed toward showing what has been, is being, and will be accomplished at Michoud.

2. DISPLAY FOR NEW YORK WORLD'S FAIR

On January 13, 1964, it was agreed that the contractor would proceed with preliminary requirements for the S-IC Boattail Model for display at the New York World's Fair. MSFC representatives told the contractor that he could reasonably expect a contract which would not exceed $255,000.

Bart S.

Please bring me up to date on the contractual arrangements made (you vs Boeing vs Dr. George Mueller). Are we covered, now that Boeing is actively running up obligations?

B

B 1/23

NOTES 1-20-64 DANNENBERG

1. Activities influencing NASA's participation in the DOD MOL (Manned Orbital Lab) program include the following:

a. A detailed GEMINI project review is being made by NASA on the present program and experiments, and the proposed GEMINI-B program.

b. NASA is suggesting that the AF buy the GEMINI-B spacecraft through NASA, utilize the GEMINI training facilities, the GEMINI-Apollo IMCC facilities, and remote sites for the MOL program.

c. The NASA/DOD Aeronautics and Astronautics Coordination Board is studying advanced planning for the MOL program.

d. The National Space Station sub-panel is studying the experimental program for MOL.

e. NASA is to establish an office at AF Space Systems Division to coordinate NASA activities on MOL. (I suggest that MSFC have a representative at this office) ✓

2. Re Notes 12-16-63 Dannenberg -

Item 5: The Saturn IB brochure, publishers format, is scheduled for presentation to you at the Staff and Board meeting on 1-31-64. It will include performance data based on 200K thrust engines. ✓

Item 6: Mr. Fero, in his answer to the Assistant Secretary of AF Letter, (Mr. Flox to Adm. Boone) suggested that the AF and NASA take a realistic look at a good set of ground rules for cost comparisons between TITAN III and Saturn vehicles. ✓

3. Panel Review Board agenda for 1-28-64 will contain among other things two 1-hour briefings by Fichtner and Palaoro to give Dr. Mueller an understanding of the type of problems and decisions made in the Mechanical and Electrical Integration Panels. ✓

4. Flight Missions for IB and V as proposed by MSC will be discussed by Shea and T. Thompson during visit at MSFC 1-23-64. You are scheduled to attend last hour of meeting. ✓ I did talk to Baker, since all others got weathered in. B

5. Bio payload (Mouse house) for SA-10 was recommended by Dr. Bisplinghoff to Dr. Mueller after Washington briefing attended by Dr. Farish.

6. Bellcomm "working level visitors" (Mr. Peterson and Mr. Wente) discussed IB and V payload capabilities with MSFC "working level personnel." Discussion went smoothly, as discussions between working level people always will. B

7. Apollo Boilerplate #16 (SM and adapter) for SA-9 arrived from NAA for installation of meteorite package (CM goes directly to KSC). ✓

KD

Is that final?

Verl (Fairchild) told me this payload was compatible with the "Advanced Micrometeorite" and could be "taken along in addition" B

FW 4/21

B 1/23

NOTES 1-20-64 FORTUNE

1. Labor Situation AT MTF: The pickets left our Laboratory and Engineering Building Tuesday morning about 9:15. The other workers immediately came in and resumed their jobs. The President's Missile Sites Labor Committee sent Harry Pirung down to hold a hearing on the dispute at the Broadwater Beach Hotel Friday, the 17th. Thursday Paul Stiles received a telegram from the senior union representative for MTF area saying that the bricklayers and ironworkers were having a dispute concerning erecting of pre-cast concrete siding. I understand that Mr. Pirung will try to resolve this also. ✓

2. Regional Planning Council Meets: Representatives from the three local Mississippi counties and Saint Tammany's Parrish, Louisiana, met Friday to organize, lay out their programs and establish operating procedures. This will help us greatly to alleviate community impact. ✓

3. Congressman James Morrison's Visit: Congressman James Morrison of Louisiana visited the Test Site Friday. John Hilburn met him, briefed him on the present state of construction and other matters of general interest. Mr. Morrison has been personally quite friendly to us. ✓

4. Gulfport Senior Citizens Visit: Leo Seal, President of Hancock Bank; Nick French, President of Board of Supervisors; Bill Simpson, President of Harbor Authorities; Mitchell Salloum, Chamber of Commerce, Gulfport, visited MTO Wednesday to offer assistance in our programs and to inquire how they might help. They are proposing to improve the road leading over to the Test Site from near the Naval Construction Warehouse Center and if we think it advisable to dig a canal from their harbor up to the same area. I felt the first proposal to be good but pointed out the latter might be quite costly. ✓

5. Visit Of NAS New Orleans Personnel: Captain Tracy and other personnel from the Naval Air Station visited MTO looking for space for a Navy bombing range. We pointed out the possible areas which would not involve flying over of our fee area, for example the Crosby Territory on the eastern boarder of the buffer zone, De Soto National Forest, Camp Shelby, etc. ✓

→ Again ??? Oh no!

B

CONFIDENTIAL

NOTES 1/20/64 GEISSLER

1. Operations Support for Apollo: MSC (through J. Hodge) has accepted the latest joint KSC-MSFC proposal for operations support during orbital checkout. We are now at the point that firm implementation plans need to be made and effected. All MSFC Laboratories concerned have agreed to a preparatory discussion prior to submitting a proposal to you.

2. Project LIEF: The difficulties with telephone companies on implementing the wideband data link between KSC and MSFC have finally been removed in several meetings. The implementation order was placed on AT &T on December 30, 1963.

3. Tracking Beacons Within IU: Dr. Mueller requested a thorough analysis of the need for all tracking beacons to be carried on Saturn IB and V vehicles. We have initiated the study and will get assistance from ASTR and KSC (Sendler).

4. Saturn V Performance: A performance survey was conducted for the Operational Saturn V and for the R&D flights based on January 1964 current weights status. Performance results were: (a) SA501-503, 82,880 pounds payload; (b) SA504-506, 88,754 pounds; (c) Operational, 89,078 pounds. The large contrast seen in 501-503 is due to the fact that specific impulse in the S-1C stage was considered down to 258 seconds and in the S-II and S-IVB stages, 422 seconds.

5. Saturn IB Performance: A performance survey was conducted for the Operational Saturn IB (200 K H-1) and for the R&D flights based on January 1964 current weights status. Performance results were: (a) SA201 & 202, 31,600 pounds payload; (b) SA203, 32,000 pounds; (c) SA204, 33,000 pounds; (d) 205 & subs, 33,200 pounds. These numbers do not take into account new loads and uprating effect. The estimated payload for SA-205 and subs taking new loads and uprating effect into account is 32,900 pounds. The specific impulse of the S-IVB stage in flights 201-203 is considered to be down to 422 sec.

6. Flight Evaluation Panel: The panel has been approved by Dr. Mueller. Final membership is being formalized.

7. Saturn IB Dynamic Test Program: MSFC's original IB dynamic test program required a flight type CM plus SM. This original requirement was based on unofficial P&VE information which indicated gross stiffness differences (more than an order of magnitude) between the boilerplate (BP) and flight articles. Last fall, Houston agreed to supply a flight type SM but could not supply a flight type CM due to hardware schedules and stated that earlier CM stiffness data were wrong and that current analysis revealed only slight differences in CM stiffness. We then asked for this more recent data and suggested an alternate test plan using the BP/CM for the majority of the 6 month program and the flight hardware for only two one week test periods. We pointed out that we would follow this approach, provided our analysis confirmed the similarity between boilerplate and flight hardware. This data request and the subsequent plan were officially suggested for comment at both the Mechanical Integration and Flight Mechanics Dynamics and Control Panel in December 1963. Structural data were furnished by MSC, however no comment on the proposed CM loan has been received. We have confirmed the similarity by analysis and have relaxed our requirements accordingly. Our new official test plan calls for two one week loans of the CM during the first and second stage test programs, spring and summer 1965 respectively.

E.G. Looks like we must dynamically test Sat IB for 4 flight mission configurations, as discussed w/ Kuettner and Baker on Jan 23. B

CONFIDENTIAL

NOTES 1-20-64 GRAU

1. S-IV-6 POST-STATIC CHECKOUT AT DAC, SACRAMENTO: Rework of the Moog actuators has been completed on the S-IV-6 stage. Extensive modification and rework presently in process will necessitate retest of all affected systems at a sub-system level, and rerun of the Simulated Flight Test. Post-static Simulated Flight Test, Instrumentation Calibration Test, Electromagnetic Compatibility Tests, Antenna Systems Test and Telemetry Sub-systems Tests are unacceptable to this Laboratory. We are working through Industrial Operations to bring about necessary retesting. The Command Destruct System has not yet been checked out.

2. S-IV-7 CHECKOUT AT DAC, SANTA MONICA: The S-IV-7 stage is undergoing modification and rework in the vertical checkout area at Santa Monica. Post-manufacturing Instrumentation Calibration, Electromagnetic Compatibility and Simulated Flight Tests are unacceptable. Again, we are working through Industrial Operations to bring about necessary retesting. Approximately sixty-one (61) instrumentation components are missing on this stage.

3. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHOUD: Pre-static checkout of the S-I-8 stage has resumed at CSD, Michoud, after replacement of tubing.

4. CALIBRATION FACILITY: The workload and work output of the calibration facility in this Laboratory has consistently increased during 1963. A nucleus of civil service personnel, supported by a calibration contractor has calibrated approximately 12,500 items. Breakdown is as follows:

Quality and Reliability Assurance Laboratory	57.2%
Manufacturing Engineering Laboratory	11.2%
Astrionics Laboratory	6.3%
Test Laboratory	7.3%
Propulsion and Vehicle Engineering Laboratory	3.5%
Others	14.5%

The AMSC calibration laboratory participated by calibrating 10.3% of the total number of items and the Test Laboratory took care of .3%.

5. LAUNCH AND CHECKOUT COMPUTER PROGRAM CONFIGURATION AND CONTROL PLAN: A "Launch and Checkout Computer Program Configuration and Control Plan" has been prepared by MSFC Automation Sub Board No. 4 to provide a common language for vehicle checkout and launch, and to provide management with a tool for controlling stage contractor efforts in the field of automatic checkout. Direction has been given each of the Saturn Stage Contractors to implement the plan. Over 1300 copies of this plan have been requested to date, not only from elements involved in the Saturn programs, but from other programs as well.

6. OFFICE OF RELIABILITY AND QUALITY ASSURANCE IN THE APOLLO PROJECT OFFICE UNDER DR. MUELLER: Dr. Turnock who was put in charge of this office at the reorganization in November 1963, has resigned, as has Dr. Young, his right hand man. Both are leaving for private industry. Dr. Harvey Hall has been temporarily assigned to Dr. Young's position. Mr. George Lemke, formerly MSC Resident Manager at S&ID, Downey, California, has been given temporarily the position vacated by Dr. Turnock. In his new capacity, Mr. Lemke, with whom I had frequent contact in the past, will visit with me January 23. My hope to get something going with that office is flaring up a little bit.

NOTES 1-20-64 GRUENE B 1/24

SA-5 Status

1. Contrary to my notes of last week to you about Radio Frequency Interference, we still observed interference with the structure removed. We have run Radio Frequency Interference tests continuously and have come to the conclusion, with concurrence from Mr. Hoberg, to eliminate a power output amplifier in the UDOP System. This will cut down the possibility of getting command interference, but at the same time, provides UDOP tracking during the early part of the flight where UDOP is of highest value.

2. The expended Radio Frequency Interference tests squeezed our time available for systems verification test, but we believe with the use of extended overtime, we will be able to meet the scheduled Simulated Flight Test on January 22.

3. It was necessary due to a request from the Range to change the Arming of the S-IV Cutoff from a PU System developed signal to a time signal. The Range had observed problems with other missiles where a similar action resulted in impact on land. This change was coordinated with P&VE, Aero-Astrodynamics, and Astrionics Laboratories.

7a/1/21

NOTES 1/20/64 HAEUSSERMANN B 1/24

1. SA-7 AND SA-9 GUIDANCE: The Mod III guidance polynomial for SA-7 has been run in the 6-dimensional digital simulator with over 20 cases of various perturbing influences and appears to behave satisfactorily in all respects thus far. Additional cases will be run, but no adverse effects are expected. Similar tests are being made on the SA-9 polynomial. Only twelve cases have been run so far. ✓

2. STATUS OF IU MOCKUP: The mockup of the IU corresponding to the 201 configuration will probably be completed by mid-March; it will serve for the cable layout work in particular. ✓

3. CABLE ROUTING - SATURN IB/V IU FOR MINIMUM RADIO INTERFERENCE: ✓
We have investigated a proposal to lengthen the IU from the present 3 feet to 5 feet to allow easier cable routing. By mounting the cold plates a little further away from the skin, room for cable routing becomes available. L-brackets will be required to accommodate cable overrun. Brackets may extend slightly into the space above the IU not used by the spacecraft. This has been discussed with MSC, and they have no objections provided they can concur in the final layout and that we do not tie onto any of their items or structures. → So we stay with 3 ft length.

4. S-IU-500FS: Programing and funding information you requested will be forwarded as a separate submission. ✓

→ even with the 3 ft length.

Hermann Geidner

B 1/24

Gilly Mrazek told me 1/4 y ago that this proposal had been looked into, and agreement had been reached not to provide it. I am greatly surprised that Häussermann is bringing it up again. It surely must make a very bad impression in Washington that now, almost 2 ys after initiation of the Sat V, MSFC is still not sure as to how long the I.U. ought to be! This your own "in-house stage," after all!! B

NOTES 1/20/64 HEIMBURG B 1/24

1. F-1 TESTING (STATIC TEST TOWER WEST):

A 25-second mainstage firing was conducted on 1/17, for the purpose of approaching the proper calibration of this engine. A high-temperature (above 2,000°F.) spike was recorded at the turbine inlet as a result of the lowered fuel pump inlet pressure. Solution of this problem will be coordinated with P&VE and Rocketdyne. The chamber leaks appear to have been satisfactorily repaired.

2. MEETING WITH OFFICE OF SPACE SCIENCES (OSS) REPRESENTATIVES:

A meeting was held at the Test Laboratory on 1/18 with Dr. Richard Morrison and Mr. William Bos of OSS (NASA Headquarters) to discuss a program for the use of FLOX in engines of the H-1 class. Our opinion of this situation is that OSS has been effectively blocked by the Air Force in starting any program to up-grade the Atlas payload capability by the use of FLOX. OSS wants to use the MSFC test facilities, since they have been blocked by the Air Force in using the Rocketdyne and Edwards facilities for this work. FY 1964 and FY 1965 funding for FLOX work totals $26.9M, which has been approved by the Bureau of Budget. Dr. Silverstein apparently feels that FLOX cannot be used in the Atlas without a full cluster (two boosters and sustainer) test, which cannot be readily performed with facilities existing at Rocketdyne or Edwards Air Force Base. To accomplish this program within the short time frame and minimum funding available, full cooperation of Lewis, Rocketdyne, and General Dynamics/Astronautics is an absolute requirement.

7w 1/21

B 1/24

NOTES 1-20-64 HOELZER

1. COMPUTER SUPPORT FOR ASTRIONICS LABORATORY: The Computation Laboratory has been working with Mr. Fichtner regarding needs for ground support checkout equipment. It appears we have been able to handle a requirement with in-house computers which at first appeared would require the addition of another computer at MSFC. ✓

2. ORBITAL DOCKING SIMULATION PROJECT: The Orbital Docking Simulation System is essentially complete and is scheduled for operation the week of January 20th. A demonstration of this system can be scheduled at your convenience.

3. NEW EQUIPMENT: An Electronic Associates 231R-V analog computer was delivered December 26th. An ASI-210 digital computer, which was ordered to replace a PB-250 computer, was delivered January 6th. Both computers are now being checked out. ✓

HH

Please arrange date

Tom Bonnie B

fw 1/21

B 1/24

NOTES 1-20-64 JAMES

The CCSD Mission Effort (Saturn I and IB) - Tasks identified by the laboratories in response to the Newby Committee have been received and are being reviewed. A target for contract coverage on those tasks clearly identified by the laboratories is early February. The remaining tasks will be reviewed with the laboratories for subsequent contractual action.

SATURN I - SA-5 Change Status - See Enclosure.

S-IV Cold Helium Sphere Testing - Random testing was completed successfully on January 16, 1964 and, after visual observation, approval for present S-IV-5 installation was given. Sinusodial testing is continuing. Design and Fabrication of the backup is proceeding if required for S-IV-6 and subs.

S-IU-6 - All changes to IU-6 flight control computer necessitated by S-IV-6 change to Moog actuators have been accomplished, and the computer is in checkout and inspection here at MSFC. The computer is on schedule for a March 3, 1964 delivery to AMR. Astrionics has contacted AMR personnel and the Cape requirements will be met.

SA-10 Payload - In response to Dr. Stuhlingers request, Dr. Bisplinghoff sent a letter to Dr. Mueller outlining some of the proposed SA-10 experiments and requested that SA-10 be retained in the Saturn IB Program.

SATURN IB - I.U. - Dr. Mueller has signed the Procurement Plan for the ST-124M Platforms (Flight Hardware) and forwarded to Dr. Seamans. A TWX has been sent to NASA Headquarters asking approval to amend existing letter contracts to include flight hardware for digital computer and data adapter. Contract is required by February 15.

S-IVB - DAC engineering has determined that the forward dome for the hydrostatic stage is unqualified for its intended use, and will not be installed as scheduled. The dome has a weld repair area which, although passed by DAC and AF quality control, would not, in the opinion of DAC Engineering, provide representative structural information and integrity. DAC attributes this to weakness in the material around the weld seam due to a number of repairs which were made there. DAC Engineering desires to utilize the dynamics stage forward dome for the Hydrostatic stage. DAC Engineering is further investigating the possibility of utilizing the "former" Hydrostatic stage dome for the Dynamics stage. A firm position should be available by next week.

It has been determined that there is a slight leak in the common bulkhead area of the Dynamics stage. The leak appears to be in the periphexal seal weld between the attach angles. Only minor filling of the suspected area appears to be required. The exact point of leakage and the rate will be determined during Hydrostatic proof test.

The necessary design changes to the S-IVB/IB stage to withstand uprated H-1 engine thrust has resulted in a payload penalty of 342 pounds. The earliest effectivity, as stated by DAC, is SA-203 with no launch slip. If incorporated on SA-201, a slip to the SA-203 date is anticipated. These weights do not include design changes resulting from the increased aerodynamic loads.

→ Lee J.
Have we brought that? B

fw 1/21

B 1/24

NOTES 1-20-64 Koelle

1. THE LATEST INFORMATION ON THE USAF MOL PROGRAM IS:

a. SSD will manage it. General Funk has set up a management team under General Bleymeir, TITAN Project Manager. General Schriever has seen and approved the general management plan for the Air Force MOL. Colonel Don Heaton is considered as one of the applicants to head the AF MOL efforts. NASA will have a field office under General Bleymeir at SSD patterned after the USAF setup with NASA's GEMINI program. ✓

b. To eliminate confusion with USAF terminology, the Office of Advanced Studies is using the following unofficial names for NASA's laboratory program:

APOLLO X	Lifetime greater than 30 days
APOLLO Orbital Research Laboratory (AORL)	90 days to one year
Manned Orbital Research Laboratory (MORL	Greater than one year
Large Orbital Research Laboratory (LORL)	Three to five years

c. Comment: If MORL QUORLs with AORL, conditions could become IMORL. !

2. REUSABLE ORBITAL PASSENGER CARRIER: This week we will have the final presentation on the Lockheed version of the Reusable Orbital Carrier (ROC). A three-hour presentation is scheduled for Thursday, January 23, 1964. Do you have any desires for a special briefing?

fw 1/21

B 1/24

NOTES 1-20-64 KUERS

1. Saturn V, S-II Stage: Reference my NOTES 12-16-63, copy attached. We have evaluated the new manufacturing proposal of NAA for the common bulkhead, called the Inflation Assembly Techniques, and arrived at the conclusion that we would not recommend to develop this technique. The inflation of the lower face of the bulkhead for the purpose of fitting the honeycomb core to it is definitely advantageous, represents an improvement over the present technique, and can be used for both manufacturing methods of the common bulkhead which are presently actively pursued and which differ only in the design, fabrication and assembly of the upper face of the bulkhead. We approve, therefore, this portion of the proposal. We believe, however, that the proposed tracing and machining techniques which would replace and automate the handfitting operation would require a development program which would be costly, requiring additional floor space, would be time consuming, and the results of which might not be satisfactory at the end. ✓

The second approach to build this common bulkhead is, as you know, the "Strip Seal Design" approach. Disadvantages of this method are: (1) It is 500 to 600 lbs heavier than the primary approach and (2) It has also some serious manufacturing problems in welding of the buffer and seal strips. The latest proposal, favored by MSFC, is to replace the welded seal strips by bonded strips using a special Narmco adhesive which apparently has all the required properties for this application. ✓

2. Saturn V, S-IVB Stage: The Manufacturing Engineering Working Group held its fifth general meeting with DAC here for review of manufacturing techniques and problems. On the first day a number of "Technical Communication" meetings took place, by a small number of knowledgeable people (6 to 8), in which topics like horizontal welding, flaring techniques for tube connections, or special tooling or manufacturing problems were discussed. The second day was used for a review by manufacturing management of the progress in solution of problems. ✓

fw 1/21

B 1/24

NOTES 1-20-64 LANGE

WASHINGTON VISIT BY UNIVERSITY OF ALABAMA/TUSCALOOSA BUSINESS PEOPLE: A group of Tuscaloosa business people and University of Alabama officials, including Dr. A. Pow (Dr. Rose joined later), visited with Mr. J. Webb and the Headquarters staff on January 10, 1964. Their intention: to invite NASA to place business in a Tuscaloosa Research Park area of some 700 acres. The proposal was apparently a strictly "Tuscaloosa local" backed by the University of Alabama. Mr. Webb appeared puzzled, first that the University of Alabama and the Tuscaloosa business people came to see him directly for such local interest, and second they had not seen the NASA "Rep." in their area, the MSFC (more details available to you). Dr. A. Pow called today to make arrangement for a MSFC-Tuscaloosa business-University of Alabama mutual briefing here at Huntsville.

!!

O.L.

I'll be the coldest fish they've ever seen!

B

fw 1/21

B 1/24

NOTES 1-20-64 MAUS

1. NASA REQUIREMENT FOR PROGRAM OBLIGATION PLANS - MSFC has now officially received the request from headquarters for submission of Program Obligation Plans (POP) to MSF; the first is due Feb 7. As indicated in my notes last week, this is an all purpose budget/program document. The February issue will serve as the flash FY 66 budget estimate, supporting justification for FY 65 budget, and a report of execution status for FY 64. ✓

   Our previous local planning has provided for generation within MSFC of FY 66 flash information by Feb. 3. This information will form the basis for the Feb. 7 POP submission. ✓

2. MSF COMMITTEE ON PROGRAM SCHEDULING AND REVIEW PROCEDURES - Tom Smith met last week with the Committee for Review of OMSF Program Scheduling Procedures. Bill Lilly, Committee Chairman, is to present the Committee's recommendations at the Program Management Council Meeting tomorrow.

   A draft summary of the Committee's action and recommendation has been placed in your Management Council briefing folder. ✓

3. APOLLO SCHEDULE - COST ANALYSIS - Preliminary results of the Apollo Program Schedule/Cost Study (J. A. Bethay of this office was MSFC coordinator) have been presented to Dr. Mueller, and John Disher will present these results at the Program Management Council Mtg, Tuesday. As an extension to this exercise, Dr. Mueller is arranging with MSFC Project Managers to have the major Apollo prime contractor program managers participate in this exercise. Specifically, the contractors are being asked to study their part of the program using the same ground rules (six month acceleration, three year delay, and six year delay in Apollo Program completion) as used in the preliminary study. ✓

   I feel this is something that should be done completely in house. fw

4. NASA MANAGEMENT INSTRUCTION 2-0-1, ORGANIZATION - We forwarded comments Friday, to headquarters on the latest revision, Draft Nr. 10, to the NASA Management Instruction on Organization. Principal objection was that, in addition to Dr. Seamans' approval of all changes to the basic organization structure, the policy would authorize institutional directors (Dr. Mueller) to establish criteria for approval of changes below and beyond basic organization structure. We feel that Dr. Seamans' approval of basic structure is the maximum requirement that should be imposed on center directors, and we requested deletion of the provisions that would authorize institutional directors to establish further requirements.

   Agree B

NOTES 1-20-64 McCartney B 1/24

1. Unencumbered Funds Transfer Study: On January 17, the laboratories completed the FY-64 detailed Saturn V financial analysis. Similar evaluations of Saturn I, Saturn IB, and SRT are expected to be accomplished by January 21. The study objective is to identify program elements whose FY-64 program authority is expected to exceed contractual cost accrual. (As previously reported, we have agreed to transfer $25 million from R&D Operations Saturn V account to Industrial Operations.) Mr. Bush of my Programs and Contracts Group and the Financial Management Office are now analyzing the laboratories' Saturn V recommendations and a report is expected this week. With these figures, we plan to discuss a new FY-64 Program Operating Plan with Industrial Operations. As reported last week, we expected to have that discussion January 15-17, but were unable to complete our scheduled laboratory review within the estimated time.

2. FY-66 CofF Program: Mr. Weidner and Mr. Read will meet with Mr. Heimburg on January 20 to make a final determination concerning Test Laboratory requirements. The firm R&D Operations proposed program will be forwarded to the Facilities & Design Office immediately following that meeting.

3. Manpower: Recent actions of the Manpower Committee (McCall, Balch, Huth, and Andressen)which impinge on R&D Operations are as follows:

a. The level of quality control required by MSFC. ACTION: Mr. Young is preparing figures to be forwarded to Mr. Grau which will be discussed January 24 to determine the appropriate level at the various locations.

b. Removal of support contractors from sensitive areas. ACTION: Last week, Executive Staff was to have prepared definitions of sensitive job positions which could be distributed by the committee members to the organizational elements they represent to determine how many critical cases we have requiring replacement by civil service employees. To date, these definitions have not been received by the Committee.

c. Urgent manpower requirements throughout MSFC. ACTION: Each member of the Committee is examining the organizational element he represents (Dr. McCall for R&D Operations) to determine the number of spaces required.

By the end of January, the Committee expects to inform R&D Operations how many of the new 370 spaces will be allocated to us. These spaces will be distributed on the basis of a previously justified general plan. We will follow our present practice in R&D Operations by distributing exactly the number of spaces we have plus a separate number for a "recruiting ceiling" to each laboratory.

FW 1/21

B 1/24

NOTES 1-20-64 MRAZEK

1. COLD HELIUM BOTTLES: (Reference NOTES 1-13-64 MRAZEK, paragraph 1.) Tangential tests on cold helium bottle assembly were successfully completed on 1-16-64. As stated in telephone conversation between you and Mr. Hellebrand, test results give reasonable assurance that the cold helium bottle assembly is qualified for the SA-5 flight. ✓

2. INSTRUMENT UNIT MOCKUP FOR SA-201: The structure for the Instrument Unit mockup (SA-201 configuration) is complete and ready to receive instrumentation. Approximately 70% of the instrumentation components are being fabricated. Design information for the remaining 30% is not complete. ✓

3. S-IVB VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: This group held its fifth meeting 1-14/16-64. (action items attached) ✓

4. H-1 ENGINE: a. The 200K-engine testing is proceeding successfully. The third engine has completed 3,000 seconds of testing; the fourth engine is being tested.

b. The turbine exhaust hood failed 200K testing. A bellows-to-hood weld failure occurred after 2,100 seconds. A crack occurred in the bellows convolution during component qualification vibration testing. These failures indicate that the turbine exhaust hood design may be marginal at the 200K level.

c. The fourth LOX pump bellows seal has failed; all failures have occurred in the first convolution near the bellows-to-seal weld. Analysis of the first two seals which failed revealed that they were not annealed after heat treating. The third and fourth are being analyzed.

d. Low Delta-P injectors went unstable when bombed at 220K level. A series of bomb tests were run to determine the stability threshold of the low Delta-P injectors. Seven out of 13 bomb tests over 210K were stable. ✓

5. F-1 ENGINE: a. Test #4 was conducted on engine F-1001 at the MSFC single-engine test stand. Programmed duration of 20 seconds was achieved. A flight configuration LOX dome purge line failed and was replaced with a hard line. ✓

b. Excavation below the flame deflector prevented testing on Stand 1A; an ignition-only test was performed on Stand 1B to check out a 24-shingle nozzle extension recently installed. Engines 014 and 019 are scheduled to arrive at Edwards Air Force Base this week. ✓

c. Primary bellows of outboard LOX pressure volume compensator squirmed during proof-pressure test (S-IC). One primary bellows squirmed after 30 seconds at 285 psig. The cause of squirming has not been determined, but the bellows may be marginal at this pressure. A new bellows will be installed and proof-pressure tests will be conducted.

d. An interim instrumentation system for measuring the vibration environment of the F-1 engine aboard the Pregnant Guppy during transport from the Rocketdyne facility to MSFC was completed and calibrated. ✓

Attachment #1: NOTES 1-13-64 MRAZEK
#2: Action Item Report

W.M.

Were specs inadequate?

B

NOTES 1/20/64 RUDOLPH

1. FY64 Funding - Received teletype from MSF on Jan 11, 64, authorizing $607 M of total FY64 Saturn V program of $681.1 M (w/o FY64 supplement). To date Saturn V has obligated $445.0 M (65.4% of total annual plan w/o supplement).

2. Saturn V Information Brochure - Boeing has completed the first draft of the Saturn V information brochure. Copies of the brochure are being made available to each member of the R&DO and IO Technical Brochure Task Team for review. A meeting to obtain MSFC comments is scheduled within two weeks. The final brochure is targeted for publication before the end of February.

3. S-IC Stage:

RCA 110A - Schedule J_1 (Plan VII) will require four test and checkout stations at Michoud. Based on a decision by MSFC that one computer will service only one set of test and checkout equipment, a requirement for one additional RCA 110A computer now exists. The necessary action will be taken to add one additional computer to the RCA Contract.

Test Fuel Tank - Delivery of the test fuel tank to P&VE for start of structural test is now scheduled for mid February 1964.

4. S-II Stage:

S-II/S-IC Interstage - During a joint meeting between MSFC and LOC, a decision was made to install the S-II/S-IC interstage at MILA. The LOC recommendation that the interstage be installed at MTO in lieu of MILA presented numerous technical, facility, and GSE problems which discouraged the acceptance of this recommendation.

S-II/S-IVB Interface Tool - The S-II/S-IVB master mating interface tool which was fabricated by NAA/S&ID has been shipped to Douglas Aircraft Corporation.

5. S-IVB Stage:

Telemetry - Planning is underway to provide the initial telemetry equipment to DAC as GFE. Required delivery dates have been obtained from DAC; however, these dates appear to be earlier than either DAC or MSFC could meet. Discussions are in process with Astrionics Laboratory on the possibility of furnishing DAC critical telemetry items on loan basis.

Note - Other significant S-IVB items included in Col James' notes for this week.

6. Instrument Unit - The IBM Systems Integration and Checkout Contract ~~will be~~ forwarded to NASA Headquarters January 16, 1964, for approval. The delay in getting this contract negotiated and finalized has resulted in a request to NASA Headquarters for funding approval to IBM in excess of $1.0 M.

Tw 1/21

B 1/24

NOTES 1-20-64-SHEPHERD

No Notes

fw/1/21

B 1/24

NOTES 1-20-64 Stuhlinger

1. REVISION OF FY-'64 MSF-MSFC SUPPORTING RESEARCH AND TECHNOLOGY PROGRAM:
After a revision of the FY-'64 MSF-SRT program, the new program was endorsed by the Lab directors, presented to MSF on January 15, and approved by Dr. Mueller on January 16. It contains 115 tasks for $18.3 million. The revision aimed toward a closer relation between the program and the "main stream" of the Saturn-Apollo program.

The late time in the fiscal year will require considerable effort from the task originator in technical contract negotiations, and from P&C in administrative contract negotiations. ✓

2. ADVANCED LAUNCH VEHICLE TECHNOLOGY MEETING: On January 14-15 a meeting was held at MSFC with representatives from all Centers on advanced technology currently in process which is applicable to advanced launch vehicles. This meeting was sponsored by Mr. M. B. Ames, Jr., OART, and chaired by Mr. F. J. DeMerritte, OART. Following the presentations by the Future Projects Office on advanced launch vehicle concepts, presentations on technology in support of launch vehicles were made by Lewis, OART, Langley, Ames, FRC, and Marshall. Mr. Miles, RPL, made the Marshall presentation which covered the appropriate OART and OMSF tasks. ✓

E.S.

Dr. Mueller assured me again that item-by-item approval by Seamans was not necessary. Please inform me at once, should anyone in the channels insist on such a procedure

B

January 27, 1964

NOTES 1-27-64 BELEW

B 2/7

F-1 ENGINE PROGRAM

The gas cooled skirt (nozzle extension) has been successfully tested twice in the past week for 120 and 150 seconds at rated thrust.

The Sixth F-1/S-IC Interface Meeting between MSFC, Boeing and Rocketdyne was held at MSFC on January 16. The success of the meeting is attested to by a continued decrease in number of incomplete action items.

External tube leakage on engine F-1002 has resulted in a decision to discontinue acceptance testing and to replace the thrust chamber. Delivery to MSFC is expected to be delayed until mid-March. Leakage is attributed to stress concentration and poor fit up at the lower end of the thrust chamber jacket. Reinforcing bands plus modified braze fixtures are being investigated as possible corrective actions.

J-2 ENGINE PROGRAM

Three engine system test stands are currently in operation. A total of six engine system tests for a combined duration of 56 seconds were conducted. Four of the tests were run to program cutoff. The other two tests were terminated prematurely because of gas generator overtemperature caused by fuel pump stall, and gas generator overtemperature caused by the main oxidizer valve failing to open.

A shortage of engine hardware has delayed the reactivation of vertical test stand VTS-3A and additional testing on VTS-3B.

RL10 ENGINE PROGRAM

P&WA has conducted over 100 restart firings on a single "engine-build" with no detrimental effect. The ignition system has demonstrated its durability with 95 firings totaling 6,079 seconds on a single ignition system. During a rapid restart demonstration in support of the Centaur program, the RL10 engine was restarted 20 times, with firing durations ranging from 20 to 60 seconds, and coast intervals of 2 seconds to 60 minutes. Another 15 rapid restart demonstration was recently conducted. In both cases the engine operated normally and was capable of additional restarts.

H-1 ENGINE PROGRAM

Production of 188K engines will be completed this month. All future engines will be of the 200K version.

Copies of the new 200K model specification were received at MSFC for review and approval during this report period.

M-1 ENGINE PROGRAM

An M-1 Engine Sound Conference is scheduled at Lewis Research Center on January 30 & 31, 1964. The conference will be attended by representatives from Aerojet General Corporation, Wright Patterson A/F Base, Langley Research Center and MSFC.

GENERAL

It is planned that a Technical Management meeting will be held with Rocketdyne on February 3 & 4. A review of J-2 and F-1 will receive maximum emphasis with special attention on performance. Herman Weidner, Bob Young, W. Mrazek, H. Paul and I plan to be there.

NOTES 1/27/64 CONSTAN B 2/7

1. CHECK OUT OF S-1-8

Check out of the S-1-8 is continuing. Because of the tubing assemblies replacement, electrical check out has been restricted to the measurement area only. It is anticipated that replacement of tubing assembly shall be accomplished by February 8, 1964. The estimated completion date for pre-static check out of S-1-8 is March 9, 1964. ✓

NOTES 1-27-64 DANNENBERG B 2/7

1. The Saturn IB brochure presentation, planned for the Staff and Board meeting, has been cancelled. The performance data required to complete the document is now scheduled to be available 2-3-64. Details for the brochure have been agreed to by Industrial Operations and Design laboratory personnel. Plans are now being made to staff the final draft of the brochure through OMSF for approval before publication. Concurrence of the document will be obtained from the performance review board, laboratory directors and I-I/IB Director before it is forwarded to OMSF. ✓

2. Dr. Gray's office, OMSF, has provided new definitions for NASA's space station studies because the AF is now in charge of the Manned Orbiting Lab (MOL). NASA's studies are now termed Orbiting Research Labs (ORL). These studies and their objectives are as follows:

Extended Apollo-X	30 days in orbit
AORL (Apollo Orbit. Res. Lab)	30 to 90 days in orbit
MORL (Medium Orbit. Res. Lab)	1 year in orbit
LORL (Large Orbit. Res. Lab)	3 to 5 years in orbit

Basic requirements were also provided for NASA's ORL. They must have the capability of docking, crew rotation and resupply. As presently planned, the AF MOL does not meet these requirements. ✓

3. Apollo Flight Missions - Progress has been made between MSC, MSFC, and Bellcomm in realigning flight missions for Saturn IB and V. Full meeting on this subject is planned for 2-4-64 to achieve agreement on basic points, details to be worked out later. Summary will be given to you in this meeting. ✓

4. Panel Review Board meeting will be held at Cape on 1-28-64. No major technical discrepancies are anticipated. ✓

5. S-II Cost Reduction - R&D is reviewing NAA proposals including LH_2 overboard venting in lieu of recirculation and deletion of present PU system. Final results will be available about 2-1-64, and will be reported to you. ✓

B 2/7

NOTES 1-27-64 FORTUNE

1. Labor Situation at MTF: Construction workers are back to work at the Laboratory and Engineering Building. However, the President's Missile Sites Labor Commission is to hear arguments on this dispute in Washington at 2 o'clock p.m. on January 24, 1964. All parties, Warrior Construction Company, Harders Incorporated and the IBEW are expected to present briefs on the problem. The commission may make a ruling or continue to hear further arguments. ✓

2. Contract Negotiations with GE: These were suspended Monday because an impasse developed over NASA's rights to prior approval of GE staffing plans and implementation plus designation of certain personnel such as section manager as Direct (as NASA feels warranted) VS Indirect which GE wants. MSFC representatives were in complete accord that we need to know GE hiring programs before not after the fact, and where their people are working, if we are to keep their numbers in reasonable quantity and balance between Huntsville and Mississippi. Henry Auter and I did not appear to make any impression on Bill Eaton Tuesday that he would get more and more freedom as his people demonstrated capability and performance, he being adamant that we were usurping his management authority, and detracting from job attractiveness to his "eager-to-take-the-reins" section managers. ✓

BF
Most certainly!!
B

3. More Road Blocks: The Hancock County Board of Supervisors met on the evening of January 23, 1964, and determined that they could put road blocks on all roads leading into the test site as of January 24, 1964. They have been stopping all cars attempting to traverse county roads into our area. The Corps of Engineers is trying to reach settlement with the Board.

BF
What's their motivation At do that?
B

NOTES 1/27/64 GEISSLER B 2/7

1. Use of Toxic Fuels in Static Tests: Wednesday, Messrs Heimburg and Tessmann of Test Laboratory and Messrs Vaughan, Scoggins, and Kaufman of Aero-Astrodynamics Laboratory discussed above subject since local static tests using Flourine are being seriously considered. Flourine is extremely toxic and its propagation and diffusion by the atmosphere may be a significant local problem. Mr. Heimburg briefed us on current status and indicated that model tests will probably be run this spring. Test Laboratory asked us to help define diffusive characteristics under various atmospheric conditions and provide necessary atmospheric monitoring instrumentation systems as required for test. They also would like us to provide our best estimates of probabilities of critical toxicities as a function of source strength and available atmospheric data for the Huntsville area. We will gladly participate in analyzing the problem, and in case of a positive decision, we will monitor weather conditions with respect to criticality. The latter requirement may result in need of additional manpower. We consider the problem as critical, since the Huntsville climatological situation is unfavorable. Our attitude on this subject was confirmed by Dr. Panofsky, our consultant, a national authority in this field. ✓

2. Status on ALSS Activities: Reference: the recent discussion with Dr. Horner of Northrup, concerning the possible conflict of interest argument which could be raised if they participated successfully in bidding on the forthcoming study contracts on ALSS (see item 2 of enclosure 1). We would like to bring you up to date on the extent of present activities on ALSS (see enc. 1), and we would also like to remind you of Dr. Mueller's strong position recently taken on in-house support for this study (see notes dated 11/11/63, copy attached as enclosure 2). I will discuss this problem with Mr. Gorman, but I don't think we will be able to let them do both in-house work, and bid on the study contract. If you agree, I would prefer to strengthen their in-house effort, which could in effect, establish a third scheme for ALSS.

I guess there is no other choice, then. B

EG

Contract manpower, I hope.
We can get money from OSS, but not spaces B

NOTES 1-27-64 GRAU B2/7

1. S-I-6 POST "RE-TUBING" CHECKOUT: Pressure and functional tests of the S-I-6 stage were completed January 21 and returned to building 4708 for final performance tests. It is anticipated that the stage will be returned to Manufacturing Engineering Laboratory for shipment preparation prior to the schedule date of February 3, 1964.

2. S-IV-6 POST-STATIC CHECKOUT AT DAC, SACRAMENTO: The S-IV-6 stage is now located in the Engineering and Development Building for retesting of all modified or reworked systems, and for a Simulated Flight Test.

3. S-I-8 PRE-STATIC CHECKOUT AT CSD, MICHOUD: Pre-static checkout of the S-I-8 stage is approximately 45% complete. Target date for release from checkout is March 9, 1964.

4. SATURN IB/V EMERGENCY DESTRUCT SYSTEM (EDS) RELIABILITY STUDY: Dr. Kuettner requested in December that this Laboratory extend the Saturn I EDS reliability study to the Saturn IB and Saturn V EDS. A rough draft of the S-IB/V study has been prepared and presented to Dr. Kuettner. Results indicate that from a reliability standpoint, the most feasible course of actions may be listed in the following preferential order:

   a. Require that the Saturn IB/V Emergency Detection System be made up of on-board equipment only. The telemetered data would supplement the on-board data. The ground observer would serve in an advisory capacity only with no abort capability.

   b. Require that all data channels from vehicle to Integrated Mission Control Center be redundant. The mission would be aborted if a single "bit" of data of the on-board or ground Emergency Detection System indicates a vehicle failure.

   c. Prepare a design concept for a Saturn IB/V ground abort capability; perform a failure mode effect analysis; eliminate all possible first order failure modes that could lead to erroneous abort, through design changes, and use redundant equipment for those first order failures that were not eliminated. The mission would be aborted if a single measured parameter indicates a vehicle failure.

   d. Require that the Saturn IB/V Emergency Detection System have a ground abort capability as well as an on-board capability. Restrict the ground observer to giving an abort signal only if two or more "bits" of data indicate a vehicle failure.

5. BENDIX QUALITY AND RELIABILITY SURVEY: A Quality and Reliability Survey was conducted at Bendix Eclipse Pioneer Division, Teterboro, New Jersey, contractor for the ST-124 Stabilized Platform. The survey revealed that the contractor did not completely satisfy the requirements of NASA Quality Document NPC 200-2. Areas of concern were inadequate documentation in the Quality Control Manual, the end item test plan, and the test procedures. Some revisions were also suggested in their identification and record keeping procedure. All discrepancies noted were discussed with the contractor and corrections were mutually agreed upon.

NOTES 1-27-64 GRUENE B2/7

Negative report

NOTES 1/27/64 HAEUSSERMANN

No submission this week.

B 2/7

NOTES 1/27/64 HEIMBURG B2/7

1. F-1 TESTING (STATIC TEST TOWER WEST):

A short-duration test (2.4 seconds mainstage) was successfully conducted on 1/24. Test conditions were the same as the test conducted on 1/17, except the gas generator fuel purge was off prior to ignition in an attempt to reduce the turbine inlet temperature spike. Rocketdyne conducted a similar test prior to the 1/24 test at MSFC, and it was found that the temperature at the turbine torus was somewhat reduced by this procedure. The results of the 1/24 test indicated a lower value for the temperature spike; however, an unusually high spike was experienced at engine cutoff. This condition will be investigated further to determine the cause and solution therefor. Preliminary inspection of the thrust chamber indicated at least four internal tube leaks and one external tube leak. Repair of these leaks will delay the next F-1 test until 1/29 or later. ✓

2. S-IV ALL-SYSTEMS VEHICLE:

Preliminary information indicates that the all-systems vehicle was demolished during a test conducted on 1/24, due to an explosion which occurred after fuel prestart was effected and prior to satisfactory engine start. The exact reasons for the explosion are not known at this time. Preliminary evaluation indicates that the explosion was triggered by the rupture of an overpressurized lox tank. A team of Test Laboratory personnel (Messers. Driscoll, Rutledge, and Shirey) left for Sacramento on 1/25 to assist in the evaluation of the malfunction. ✓

NOTES 1-27-64 HOELZER B 2/7

No report

NOTES 1/27/64 JAMES B 2/7

FY 66 Budget Submission - Reference your note to me on 1/13/64 NOTES that I should call Lilly about the short deadline on the FY 66 budget submission. I have talked to Lilly who recognizes that the deadline has been shortened. He asked that we go ahead and make the submission on time, feeding them any changes which we may have as we come to them, in which case he would attempt to correct the submission. In the meantime, the deadline has been relaxed by one week. ✓

SATURN I - S-IV Cold Helium Sphere Testing - Strap #1 on the Cold Helium Sphere Assembly failed at 52 cps during high level sinusoidal sweep vibration in the thrust axis. The break occurred in the strap loop above the T-bar tangent. Testing was continued through the resonant dwell portion apparently satisfactorily. There was no leakage. Slight material transfer occurred in the sphere bar strap collar interface and there was some burnishing of the sphere due to strap action. There was evidence of work hardening on Straps 3 and 4. DAC replaced the straps and proceeded with testing in the tangential axis per agreement with P&VE. These tests were completed 1-25. Evaluation is continuing. ✓

S-IV All Systems - The All Systems Vehicle was unsuccessfully fired on 24 January 1964. An automatic cutoff took place 10 seconds before ignition. There was no facility steam in a diffuser. At cutoff plus 32 sec. the LOX Vent Valve quit relieving. The Helium Inlet Valve in the LOX tank pressurization system failed in the open position after cut-off. The first LOX Vent Valve froze shut. The second LOX Vent Valve never opened. The pressure in the LOX tank rose to 76 psi when it went off scale. Extrapolation of LOX tank pressure indicated approximately 100 psi at tank rupture. The aft bulkhead of the LOX tank split, then the common bulkhead split. An investigation of damage is now underway, but preliminary reports show no major structural damage to the test stand. The cabling was completely burned. The terminal room was left intact. ✓

SA-10 Payload - A meeting was held on January 24, 1964, at MSFC between representatives from OART and MSFC, to discuss the requirements of the scientific experiments proposed by the various NASA centers for the SA-10 payload. A general definition of the experiments for SA-10 resulted from the subject meeting. These experiments will be coordinated with MSFC laboratories for their concurrence. ✓

SATURN IB - S-IVB - Hydrostatic Test Stage - As reported last week, DAC engineering determined that the forward dome of the Hydrostatic test stage is unqualified for its intended use. The forward dome is still being held, awaiting a firm decision on the disposition. DAC ground out the weld repair area and a crack was revealed. This dome is inadequate in its present condition, for use on either the Hydrostatic or Dynamic Test Stages. ✓

NOTES 1-27-64 Koelle B 2/7

1. STUDY APPROVALS: It looks as if Dr. Seamans finally is starting out to approve some of the system studies. We have unofficial notice that we expect authorization this week on the following studies:

Advanced Orbital Launch Operations	(200K)
Orbital Launch Support Facility	(150K)
Utilization of Spent Stages	(100K)
Communication and Control (LESA)	(100K)
Life Support Systems (LESA)	(150K)
Operations and Logistics (LESA)	(150K)
ALLS Payload Preliminary Design	(1,600K)

LESA stands for "Lunar Exploration System APOLLO," which is a cover name for a small lunar base. We have lost another million dollars in the reviewing process; this was cut out by Dr. Seamans. HHK → What items were cut? B

I don't share that feeling at all! B

2. FPO STATISTICS: It might be of interest to those who feel that there is too much effort spent in future projects to know that the time charges to our studies have dropped 50 per cent during the last 6 months. It was an equivalent of 170 men in July 1963 and only 110 in December. I hope we can arrest this trend now; if not, I don't think we will be able to meet our obligations for the future.

It might also be interesting to note that we have a labor overhead, in terms of manhours, of almost 100% and a cost overhead of 170%. This brings our in-house engineering man-year cost to $29,650, which is about the average we have to pay for contracted studies. The output per manyear in industry appears to be larger, since we control this effort quite closely and efficiently. ✓

3. MANNED PLANETARY FLIGHT SYMPOSIUM: This week we have a review here of 12 NASA studies in this area, with MSC and Ames participating. We expect also a large number of Headquarters personnel. You are scheduled to give the welcome on Tuesday morning at 9:00 a.m., and participate on the panel Thursday afternoon at 2:15 p.m.. Tuesday evening we have a banquet with Dr. Willy Ley as a guest speaker (6:00 p.m. at the Officer's Club). ✓

B 2/7

NOTES 1-27-64 KUERS

1. Forming of Gore Segments: Forming of gore segments for the different stages of the Saturn V Program has been a manufacturing problem during the recent years because it is apparent that conventional forming methods and the equipment available in industry for this task are inadequate or at least marginal. A search for new forming methods has been undertaken with a result that presently 3 different processes are being used in this program: Bulge forming with special designed equipment for the S-IC stage; Explosive forming for the S-II stage; and Stretch forming for the S-IVB stage. The bulge forming process is considered adequate for the special configuration and special material of the S-IC stage. The explosive forming method as applied for the S-II gore segments is not the optimum forming process with respects to quality of parts obtained and because of the inherent danger of breaking of explosive forming dies which could seriously delay the program. Also the stretch forming equipment being used by DAC for forming of gore segments for the S-IVB stage is marginal because this machine was built for a 500 To forming capacity and is being used with some reinforcements with an uprated 750 To hydraulic system. The Sheridan-Gray Company, a very well known builder of stretch forming machines, has now designed and offered to NASA, DAC, Lockheed, and others a new stretch forming machine with a 6,000 To capacity which would be ideally suited for forming gore segments since it uses articulate gripper jaws which can be individually moved in two directions. Price: Approximately $1 1/2 million. DAC and also Lockheed have proposed that NASA would buy such a machine for installation at Santa Monica or the Moffett Hangar, respectively. We are evaluating these proposals. ✓

2. Saturn V, S-IC Stage:

a. We had an S-IC Manufacturing Coordination meeting last week at Michoud. Two major problem areas are recognized as a result of this meeting: (1) Design release forecasts by Boeing for CAM documentation, effective for the T-vehicle, are not compatible with Plan VI and Plan VII. (2) There are still indications that because of coordination problems between Michoud and Wichita, components for the Thrust Structure would not be produced as required for Plan VI.

b. In-house progress and problems: The Lox Tunnel has been successfully welded into the Fuel Test Container, the fabrication of which is now complete. Re-welding problem of Y-ring to dome for Lox container has not been satisfactorily solved yet. ✓

NOTES 1-27-64 MAUS B 2/7

1. MSF PROGRAM MANAGEMENT COUNCIL - Next MSF Program Review is scheduled for February 18 and requires SARP (Scheduling and Review Procedure) submission of Levels 2, 3, and A.

   For the first time, the February meeting requires a ten-minute status presentation by the Center's Deputy Director on Institutional matters. This includes manpower, facilities, and work for program offices other than MSF. We are preparing this material on the standardized format which is to be provided by Lilly's office.

   The minutes and action items from the January Management Council Meeting were mailed from Headquarters Friday, and we expect receipt today. We will follow up on the action items.

2. LARGE SOLID MOTOR PROGRAM - The NASA Large Solid Motor Program responsibility will start in FY-65. The program will be managed by OART, Del Tischler. Preliminary planning by OART is that MSFC effort could be approximately $13.0 million for FY-65.

   We recommend no specific external actions by MSFC elements regarding MSFC participation in this program until an official center position has been established. We will coordinate with R&DO and I.O. to develop a proposed position, compatible with the total resources and manpower picture.

3. MANAGEMENT SYSTEMS REVIEW COMMITTEE- Meetings of the Management Systems Review Committee were held on Tuesday, Thursday, and Friday of last week. General status of Committee activities is as follows:

   a. The Budget Execution Procedure has been drafted and is now being staffed through Messrs. Weidner and Young to Mr. Gorman for signature.

   b. The review by the Committee of a draft of ANOPPA (Advanced Notice of Proposed Procurement Action) was conducted Friday, January 24, 1964. It will be staffed through Messrs. Weidner and Young this week.

B 2/7

NOTES 1-27-64 MRAZEK

1. S-IC AIR SCOOPS: Investigation of air scoop installation revealed an interference problem with the Launch Umbilical Tower. Design changes are being evaluated. There are no problems on the test stand because the scoops will not be installed for static testing.

2. INBOARD FUEL PRESSURE VOLUME COMPENSATOR: The vibrational test of the S-IC inboard fuel pressure volume compensator assembly has been completed at Boeing. The test consisted of sinusoidal sweep and dwell tests in the three major areas of the assembly with no failures.

W. Kuers for info (Location of new sketch forming machine) B

3. MOFFETT FIELD HANGAR: A report has been received that the Air Force and the United Technology Center are interested in acquiring the hangar at Moffett Field for storage of solid propellant segments.

4. H-1 ENGINE: Ten 200K H-1 engine tests were successful for 1,650 seconds total duration.

5. RL10 ENGINE: Experimental engine FX-124 had four successful runs in the self-ullaging mode. Experimental engine FX-131, which has a 58-to-1 area ratio full-regenerative thrust chamber, completed two firings with a 7.5-second increase in specific impulse; Pratt and Whitney personnel are skeptical of the data. Engine FY-150 prequalification teardown inspection has been completed and revealed insignificant wear on engine parts. Facility checkout and activation of the new propellants test facility was accomplished.

6. SATURN IB AND SATURN V INSTRUMENT UNIT: Dr. Haeussermann and I have agreed to a 3-foot height for the Instrument Unit.

7. F-1 ENGINE: The 24-shingle nozzle extension was tested twice without damage. Engine 014 test terminated prematurely because of fire. Baffles were blown off during stability testing of injector 073. High frequency buzzing was detected during stability testing of injector 082.

8. TWELVE-ENGINE CLUSTER: Nineteen firings of 12-engine cluster tests have been made with an accumulated 150 seconds firing time.

9. RIFT TERMINATION: A recommendation was made to Dr. Ray Bisplinghoff, by tedetype 1-20-64, that the RIFT contract with Lockheed be terminated on the basis that MSFC be permitted to negotiate the work to be continued in the areas of cryogenics, insulation, and structural development so that the total cost of the continued work plus all termination charges does not exceed the funds presently allotted to the contract. If this recommendation is approved, it would mean that more of the work of interest to other programs can be accomplished than is possible with an arbitrary restriction of $750,000. Also, the nonproductive termination charges are substantially reduced because of the phaseout and could make the phaseout less chaotic. Dave Novik, Harry Finger's RIFT program chief in the Office of Advanced Research and Technology, supports the MSFC proposal, but reports to the Nuclear Vehicle Projects Office that there is no interest above him. All indications from NASA Headquarters lead to the conclusion that RIFT has been completely abandoned without much concern for salvaging the good work accomplished to date, and without much thought given to a revival, at least at MSFC, anytime in the foreseeable future.

That's my impression, too.

NOTES 1-27-64 McCartney

B2/7

1. FY-66 CofF Budget: Our Facilities Group has successfully completed negotiations with the laboratories, and the firm FY-66 program has been forwarded to the Facilities & Design Office. This program consists of the following facilities:

Test Lab	
High Vacuum Test Facility	$ 3,000,000
Ext to High Press Gas Sys	1,500,000
LOX Storage - F-1 Stand	800,000
Third Dual Test Pos CTL	1,600,000
SAT V GSE Prop Loading Fac	3,500,000
Mission Contractor Bldg	500,000
Research Projects Lab	
Space Vehicle Res Lab	1,500,000
P&VE Lab	
Addn to Materials Lab	950,000
Non Destruct Test Facility	750,000
Aero-Astro Lab	
Spl Fluid Mech Lab	3,700,000
Comp Lab	
Ext to Comp Lab	2,500,000
Astrionics Lab	
Spl Power Source Lab	500,000
Electronic C/O Fac	600,000
R&D Operations	
Ofc Bldg	3,000,000
	$24,400,000

2. Facilities Familiarization Presentation: On January 22, our Facilities Group sponsored a presentation by GE to about 50 laboratory representatives. The presentation, covering GE Valley Forge environmental facilities, was well received. We plan to schedule similar presentations from time to time to familiarize the laboratories with the capabilities and availability of other special facilities.

NOTES 1/27/64 RUDOLPH B 2/7

1. Apollo Program Schedule/Cost Study - Boeing, NAA (S&ID), and DAC were requested to make an analysis of the annual and total cost for their respective programs based upon four different schedules (John Disher's study for accelerated and decelerated program accomplishment). The results of the analysis were phoned to MSF (J. Disher) on Friday, Jan 24, 64.

2. S-IC Stage:

Manpower Freeze - Received authority from MSF to lift manpower freeze on Boeing and immediate action was initiated to direct the contractor to implement schedule J_1.

RCA 110A - The RCA 110A computer delivery dates have been improved and a four-month delay of stage checkout, as previously reported, is now reduced to one month. The discrepancy of one month between delivery and demand dates is being resolved.

3. S-IVB Stage:

Telemetry - Further meetings have been held concerning telemetry. Present planning is to direct DAC to procure early telemetry requirements according to MSFC part numbers and specifications. The possibility of loaning the initial two sets to DAC is still being examined. Prior to issuing a change order to DAC, the possibility of early sets to DAC as GFE will be examined further.

4. Instrument Unit:

ST 124-M Stabilized Platform - The procurement plan for the ST 124-M stabilized platform has been approved by Mr. Webb.

Letter Contract - Approval was received by telephone from NASA Headquarters Procurement to proceed with letter contract amendment for purchase of advanced Saturn guidance computer and data adapter bread-boards and prototypes. Tentative date for negotiations on letter contracts is February 10, 1964.

B 2/7

NOTES 1-27-64-SHEPHERD

No Notes

NOTES 1-27-64 Stuhlinger B2/7

1. RESEARCH PROGRAM INFORMATION FOR MSF: Ed Gray from MSF requested that MSFC prepare a collection of narrative and exhibit material to demonstrate objectives and results of the MSFC supporting research and technology programs. Fiscal years 63, 64, and 65 should be covered. This material will be needed in forthcoming congressional committee hearings. Unfortunately, the time for preparation of this material is extremely short (only a few days). The desired format of the material is different from former formats. We agreed mutually that we will send the requested material on a continuing basis, beginning January 28. Let's make a broad program out of this, anyhow.

E.S. That's a very good idea. I've always felt that the lack of visual display (photos, models, samples) of past SRI achievements has hampered our sales efforts for new programs. Let's discuss a hard-hitting plan B2/7

2. METEOROID MEASUREMENT PROJECT: Several minor modifications are being made in the capsule design to increase reliability and to improve performance. The electronics system has been improved by the addition of redundant circuits in several critical areas (memory input, clocking pulse generation, command telemetry and some of the data sensing circuits). FSC is currently calculating an overall system reliability (for one year lifetime) of 0.75 with a confidence of greater than 0.70.

A status review was conducted with FSC at MSFC on January 23. Even with the 90 day extension in delivery dates recently negotiated with FSC, the schedule remains tight, due largely to system changes described above. Current problem areas are:

A. Completion and final acceptance of a meteoroid detector design, together with a production type fabrication technique and quality test program.

B. Final qualification of memory and clock circuits, RCA - telemetry circuits, and all FSC "in-house" circuits.

None of these problems is considered critical yet. ✓

3. UNIVERSITY OF ALABAMA GRANT: In the near future, the University of Alabama will make a new application for a NASA grant. There will be a tendency to have the new grant cover the "total university" rather than just the Research Institute.

Mr. H. Clyde Reeves, the UA Vice President in charge of Huntsville Operations, has plans to construct a graduate instruction building between the present Extension Center and the Research Institute. He would like about 20 minutes sometime during the first week in February to discuss his plans with you and your staff. ACTION REQUIRED ✓